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Spotlight on Cognitive Autonomy Support and its Connection to Cognitive Processing and Student Interest

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Spotlight on Cognitive Autonomy Support and its Connection to Cognitive Processing and Student Interest

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Dedication

To my family and teachers in my life

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Spotlight on Cognitive Autonomy Support and its Connection to Cognitive Processing and Student Interest

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The purpose of the dissertation was to explore how students' perceptions of different types of autonomy support can be associated with the motivational construct of student interest, differentiated into situational and individual interest, mediated by different levels of cognitive processing such as surface processing and deep processing, using SEM (structural equation modeling). It was hypothesized that 1) PCAS (perceived cognitive autonomy support) would influence students' individual interest, the later phase of interest development, and also that 2) the relationship between these would be mediated by deep level of cognitive processing, referred to as *deep processing* in the study, highlighting the impact of PCAS on both cognitive processing and motivation.

To this end, there were three phases to the current study: (a) a first qualitative phase using open-ended questions and a focus group interview about whether and how students perceive and experience different types of autonomy support they encounter from their instructors (Study1A); (b) a second scale development phase to develop and finalize the PCAS-K (perceived cognitive autonomy support, Korean version) and PC-K (perceived choice, Korean version) in the Korean educational context (Study1B); and (c) a third phase

to investigate the relationships among students' perceptions of various types of autonomy support, different levels of cognitive processing, and student interest (Study2, main study).

The results suggested that perceived cognitive autonomy support was positively related to situational interest directly and also indirectly to both situational and individual interest, whereas perceived choice was associated with neither interest constructs. In addition, perceived cognitive autonomy support was highly correlated with other constructs such as surface processing and deep processing, whereas perceived choice was not related to any other latent variables in the study. In contrast to my expectations, perceived cognitive autonomy support was not positively related to individual interest by mediation of deep processing. Instead, perceived cognitive autonomy support was positively associated with situational interest, mediated by deep processing. In light of the findings, the study spotlights cognitive autonomy support as a significant predictor of cognitive processing and student motivation. Further research is needed with different individuals in various contexts in order to elucidate further the relationships among these variables.

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Chapter 1

Introduction

Statement of the Problem

From a constructivist view of learning, students are the owner of their learning. Over the last three decades, student-centered self-regulated learning has received much research attention in the field of educational psychology. Accordingly, there has been a proliferation of research on how students may regulate their learning and skillfully construct their own meaning, while maintaining their volition and motivation across the school year (Schallert, Reed, & Turner, 2004; Weinstein, Tomberlin, Julie, & Kim, 2004; Zimmerman & Schunk, 1989). Educators have recognized the importance of student motivation in student-centered learning. However, what can actually be done in the classroom for amotivated students seems to be another issue.

In reality, many students struggle with either their lack of interest in content or with the challenge of the subject matter, and they often report their amotivation as one of the critical reasons. At the same time, many educators have reported the problems of helping these academically unmotivated students develop interest as well as involving them in classroom activities, because students bring different levels of initial interest and background knowledge to class every semester.

Addressing this issue, some researchers have demonstrated that designing texts so as to trigger students' feelings of interest can arouse their desire to engage the texts (Harp & Mayer, 1997). Mitchell (1993) investigated how different instructional practices and teaching strategies using technologies could foster students' interest in classroom

activities. Other researchers have focused on the cognitive aspects of student interest. For example, Sansone, Weir, Harpster, and Morgan (1992) proposed that offering a good rationale for a nonintrinsically motivated task may induce students to find proper study strategies to make the task more interesting.

In particular, Hidi and Renninger (2006) proposed that educators should recognize their potential roles in helping students develop interest from situational to individual interest by better enhancing students' *cognitive* processing in relation to accumulated knowledge and value, emphasizing how educators' *external* instructional support may gradually lead students to become independent learners who can create their own learning. However, there is little empirical research on what types of instructional support can impact the development of student interest and help its development by boosting the *cognitive* facets of motivation along with cognitive engagement.

To address these problems, and being a self-determination theory perspective, I set out to investigate what types of instructional support, in terms of what teachers say and do in the classroom, can be more positively associated with student interest, focusing on cognitive aspects of interest and engagement for the purpose of becoming more self-directed and autonomous learners.

The Construct of Interest

Interest is one of the influential motivational variables in learning and academic achievement (Dewey, 1913; Hidi & Renninger, 2006; Schraw, Flowerday, & Lehman, 2001). It has been found to influence and be influenced by attention, cognitive

performance, engagement, self-regulated learning, and different levels of learning (Ainley, Hidi, & Berndorff, 2002; Krapp, 2002).

According to Deci and Ryan (1985), feelings of interest have been associated with intrinsic motivation underlying self-determined behaviors with which individuals engage in a certain task of interest voluntarily. Hidi and Renninger (2004) defined interest as a psychological state of engagement and reengagement with something specific over time. Despite some controversy, there seems to be a consensus that interest includes cognitive aspects as well as affective facets of human motivation and that it is changeable through social interaction with the environment.

Hidi and Renninger (2006) proposed a four-phase model of interest development. The phases include: triggered situational interest, maintained situational interest, emerging individual interest, and well-developed individual interest. According to their proposition, the two early phases of interest development consist more of affect or liking (positive feelings) and relatively less cognitive processing (attention). These phases refer to "an actualized state that is elicited by interesting features in the environment" (Hidi, Renninger, & Krapp, 1992, p. 435). In contrast, the later phases of the model are comprised of not only affective functioning associated with positive emotions but also increased cognitive functioning such as more attention, memory, increased understanding, self-regulation, and deeper levels of strategies for learning along with stored knowledge or value. The model posits that individuals with emerging or well-developed individual interest levels tend to have an "enduring predisposition to seek

repeated reengagement with particular classes of content over time" (Hidi & Renninger, 2006, p. 114).

Accordingly, Hidi and Renninger (2006) maintained that "continued engagement and support sustain and deepen interest for content" (p. 117), and that interest develops according to the enhancement of cognitive engagement over time with pertinent external support. Their formulation implies that support stressing cognitive engagement is required for students to experience some level of *individual interest*, the later phase of interest development. However, little empirical research has been done on how different phases of interest can be fostered and what kinds of external support by teachers will be required to develop individual interest over time, supporting cognitive engagement and its active functioning.

Self-determination Theory

Another perspective on interest comes from Deci and Ryan's (2002) self-determination theory (SDT), with its foundation in three basic psychological needs. Some researchers have posited that feelings of autonomy, competence, and relatedness are essential to interest development (Hidi & Renninger, 2006; Renninger & Shumar, 2002). In particular, support for autonomy has been considered a catalyst to "create an optimal person-activity match," by providing an optimal environment that enhances interest (Deci, 1992, p. 61).

Self-determination theory posits that human beings are inherently motivated to internalize the regulation and external control they experience. Deci, Eghrari, Patrick, and Leone (1994) proposed that the degree of internalization might be differently promoted

by contextual factors such as meaningful rationale, acknowledging feelings, and providing choice. There are two different processes through which internalization may occur: introjection and integration. Introjection elicits internal controlling regulation that may often result in conflict or anxiety as the individual takes in a certain social value the individual does not really want to absorb. By contrast, integration facilitates self-determination, fostering intrinsic motivation in a coherent way. According to this approach to human motivation, the more integrated and self-determined people are, the more intrinsically motivated they are (Deci, Eghrari, Patrick, & Leone, 1994; Deci & Ryan, 1985; Ryan & Deci, 2000b). Following Ryan and Deci (2000b), the feeling of interest has been associated with this intrinsic motivation. Their theory implies that individuals can feel more interested in doing some activities when external support enhances their feelings of self-determination and self-direction in a situation.

Provision of Choice and Interest

Within SDT, studies have investigated the effect of autonomy support as an external support for interest or interest development (Assor & Kaplan, 2001; Krapp, 2005). In this view, the provision of choice has been discussed as one of the most efficient ways to support students' perceptions of autonomy. Thus, the impact of choice, one type of autonomy support, on interest and learning outcomes has been established (Black & Deci, 2000; Ryan & Deci, 2000b; Schraw, Flowerday, & Lehman, 2001).

Beliefs that the provision of choice enhances student motivation and learning outcomes are frequently reported by researchers (Flowerday & Schraw, 2000). For instance, based on a meta-analysis of research findings, Patall, Cooper, and Robinson

(2008) demonstrated that experiencing choice fosters a sense of autonomy and therefore promotes intrinsic motivation and learning outcomes, especially in situations where choices are relevant to the instruction, easy to make, and tapping into an individual's values, goals, and interests. Conversely, there have been some negative perspectives on the effects of choice on motivation and learning. On the one hand, some researchers have noted that offering choices among several tasks has little to do with increasing interest, pointing out the lack of cognitive engagement that sometimes accompanies such choice (Reeve, Nix, & Hamm, 2003). On the other hand, more fundamentally, different ways of defining and using *having choice* across studies have resulted in ambiguous boundaries in theoretical concepts related to having choice and experiencing other types of autonomy support. Perhaps not surprisingly, mixed findings have resulted. In a sense, my study to differentiate among possibly various kinds of autonomy support was intended to help with this confusion.

Cognitive Autonomy Support and Interest

Other researchers have argued that different types of choice might affect interest, engagement, and performance differently; they have asserted that meaningful choices are required (Stefanou, Perencevich, DiCintio, & Turner, 2004; Williams, 1998). By observing classroom practices directly, Stefanou, Perencevich, DiCintio, and Turner (2004) particularly proposed three types of autonomy support by teachers: organizational autonomy support (e.g., allowing students to choose their own group members); procedural autonomy support (e.g., allowing students to choose materials to use in class

projects); and cognitive autonomy support (e.g., allowing students to entertain multiple approaches and to choose different strategies to learn the content).

Furthermore, they contended that it is *cognitive autonomy support* that fosters a more enduring psychological investment in deep-level thinking and cognitive engagement, whereas the other two types of autonomy support, called *simple choice* by the authors, foster well-being and initial engagement in learning. Yet, Stefanou et al. (2004) did not provide any empirical research findings about the influential impact of cognitive autonomy support on cognitive engagement and student motivation. In fact, there have a number of studies on the impact of experiencing autonomy in the classroom on students' cognitive engagement along with active use of study strategies (Boekaerts, 2002; Meyer & Turner, 2002; Pekrun, 2006; Pekrun et al., 2002). However, there is no empirical research on how different kinds of autonomy support may impact cognitive engagement in different ways and even whether they elicit student interest differently.

Based on my reading of the theoretical and empirical literature and using Stefanou et al.'s (2004) work on cognitive autonomy support as a guide for how different types of choice contribute to cognitive engagement and student interest, I set out to explore how different phases of student interest can be fostered by instructional moves that facilitate cognitive processing and deep levels of thinking and learning.

Purpose of the Study

The main purpose of the study was to examine how *different types of perceived autonomy support* are directly or indirectly associated with *different phases of student interest*, mediated by *different levels of cognitive processing* representing different levels

of cognitive engagement. Fundamentally, this study stemmed from a question about how educators could trigger and enhance student interest even in a boring course and help students maintain their interest in the subject over time. There may be a great many ways to realize this goal. In this study, however, I attempted to investigate some possible associations among different types of autonomy support (focusing on perceived choice and perceived cognitive autonomy support), cognitive engagement (shallow and deep levels of cognitive processing), and different phases of student interest (situational interest and individual interest), focusing on the possible impact of instructors' cognitive autonomy support as a strong external support given in class on students' individual interest, from a self-determination theory perspective. This main research interest generated some additional purposes that I outline next.

The second purpose was to explore the direct and indirect relationships among the variables mentioned above, locating students' focus on one of the demanding courses they needed to take regardless of their interest. One of the challenging, and sometimes boring, subjects for students is a college writing course. Improving writing skills has been considered critical for college students because their professional and academic success in many disciplines depends on such skills and abilities. According to a recent nation-wide survey in the United States, most students across all ages reported some trouble with their writing and some dissatisfaction with their writing skills (Cho & Schunn, 2007). For example, although the National Assessment of Educational Progress (NAEP, 2007) reported that student writing skills improved in 2007 in comparison with earlier assessment years (1998, 2002) across various student groups, it presented that many

students still had difficulty in writing. A study in 1998 reported that approximately 1% of students have fluent writing skills whereas about 85% of students possess only a basic level of writing skills (NAEP, 1998). By reason of lack of fluency in writing and low achievement, there have been studies on how to motivate students to engage in writing activities as well as how to teach them effective writing skills (Keller, 2011).

Undergraduate students, especially freshmen or sophomores, have a tendency to experience amotivation due to lack of knowledge about the importance of academic writing skills, insufficient content knowledge, or paucity of individual values related to their future (Kidwell, 2005). They are more likely to lose interest in generating ideas and writing over a semester.

From a self-determination theory perspective, there has been some research on the relationship between teachers' autonomy support and student motivation in writing classes. For example, Perry, VandeKamp, Mercer, and Nordby (2002) demonstrated the importance of teachers' autonomy support and students' motivation in association with self-regulated learning in literacy. Through a thorough examination of elementary classroom literacy activities, they demonstrated that what teachers say and do supported students' independent thinking and learning and promoted learning processes in reading and writing. According to their propositions, even young students need more autonomy support for sharing ideas freely, regulating their own writing patterns and thinking independently rather than submitting to controlling instruction for the purpose of enhanced engagement and motivation in writing and reading classes.

Recently, many large universities in Korea have undertaken school-wide projects to promote college students' writing ability in the Korean language along with an enhancement of motivation for academic and professional writing. However, instructors in writing course have reported difficulties with students' amotivation toward participating in writing and discussing critical issues in class. Keeping these issues in mind, I outlined my study at a large university in Seoul, Korea where over approximately 1500 freshmen and sophomores including some juniors and seniors, who would only rarely have been exposed to academic and professional writing courses in secondary educational settings, were taking a writing course as a requirement. Examining a specific course content was anticipated to benefit the conclusion I could draw about course characteristics associated with engagement, even though such focus on only one domain of instruction might interfere with generalizability of the results. Also, it was beneficial for educational implications that approximately 25 writing instructors were teaching this beginning composition course, each according to their own curriculum, teaching philosophy, and instructional practices. In other words, the instructors had autonomy with respect to how to teach the course, although there was a course-wide textbook. In this context, I expected students could experience various types of instructional autonomy support across the sections, which benefitted my study in relation to allowing for variance in instructional practices.

Studying students' perceptions of autonomy support and its relation to interest in a different culture had another benefit for the greater educational research field, even though the current study was not strictly examining cultural differences. Although more

than three decades of empirical studies have been conducted on the impact of autonomy support on motivational, behavioral, and cognitive outcomes, some cross-cultural researchers have reported that autonomy tends to be confined to a western culture perspective rather than capturing a universally common need (Oishi, 2000; Oishi & Diener, 2001). For instance, Markus and Kitayama (1999) demonstrated that there was a cultural difference in terms of having choice between individuals from American and Asian cultures. However, more recently researchers have argued that autonomous regulation is a universal psychological human need and that experiencing autonomy is related to well-being across various cultures (Wichmann, 2011). Thus, there is as yet no clear consensus about students' experiencing various types of autonomy support in different cultures. Accordingly, any findings from this study were expected to contribute to the research on perceived autonomy support in different cultures by providing some chance to look at the phenomenon in a new culture.

The third purpose was to develop new reliable and valid instruments, measuring different types of autonomy support such as Perceived Cognitive Autonomy Support (PCAS-K) and Perceived Choice (PC-K) scales in a Korean educational context. The pilot study I conducted with my colleagues in America in 2012 became the basis of formal scale development procedures for the current study. The original versions of both the 30-item PCAS (Perceived Cognitive Autonomy Support) and 7-items PC (Perceived Choice) were revisited using Korean undergraduates' responses to the scales to generate Korean versions of PCAS and PC, which I called the PCAS-K and PC-K. The reason

there were thirty items for PCAS but only seven PC items was that the construct of PCAS had not as yet been well explored, in comparison with PC.

There were two reasons why newly developed scales were required for the present study. First, there had been a lack of scales to reliably measure students' perceptions of cognitive autonomy support reliably by distinguishing it from other types of autonomy support. In fact, Tsai, Kunter, Ludtke, Trautwein, and Ryan (2008) used a Perceived Cognitive Autonomy Support scale in their study to test the relation between situational and individual factors and student interest. This scale measured whether students perceived instruction as involving them cognitively and as scaffolding their conceptual understanding using four items. The sample items were as follows: "We worked through exercises that helped us understand the topic" and "Our instructor emphasized the relations between the topics discussed" (Tsai et al., 2008, p. 464). The Cronbach's alpha was reported to be 0.76 in Tsai et al.'s (2008) study. However, this scale seemed inadequate in my study in that 1) there were only four items to measure students' perceptions of cognitive autonomy support, and 2) the items appeared to emphasize students' conceptual understanding rather than instructors' autonomy support. For these reasons, a new scale to measure students' perceptions of cognitive autonomy support was developed in Study 1 with Korean undergraduates, using the set of items developed based on what Stefanou et al. (2004) had reported and on what my colleagues and I had found in the qualitative pilot study.

The second reason for attempting to develop new scales was that I assumed that Korean undergraduate students' experiences and perceptions of various autonomy

support might differ somewhat from American students' in that their experiences in a different educational context might encourage different cognitive processing about environmental support (Oysermann, Coon, & Kemmelmeier, 2002).

Outline of the Study

This dissertation consisted of two studies, Study 1 and Study 2. Study 1 was a qualitative study along with a factor analysis for the purpose of a scale developed specifically for a Korean educational context. Study 2 as the main study was a quantitative test employing correlational analysis among variables of interest, using SEM (Structural Equation Modeling). Study 1 involved two phases, Study 1A (a focus group study) and Study 1B (a factor analysis using EFA-Exploratory Factor Analysis- and CFA-Confirmatory Factor Analysis. The final items generated, tested, and trimmed through Study 1 were used in Study 2 to test students' perceptions of different types of autonomy in class. Table 1 below displays more information about the overall design of this project.

In Study 1 and Study 2, my aim was to address the association of cognitive autonomy support as another type of possibleential autonomy support on cognitive engagement and student interest, exploring whether various kinds of autonomy support had different degrees of association with student interest.

Table 1. Outline of the Current Study

		When	Purposes	Participants	Methods	Measures
Study 1	Study 1A	2012 Spring	1) to explore how Korean undergraduates naturally perceive or experience teachers' autonomy support in class 2) to investigate Korean undergraduates' perceptions of different types of autonomy support 3) to modify/trim each item to make it applicable to Korean educational settings	29 undergrads in total (28 answers actually used for analysis)	Qualitative study based on Grounded Theory analysis	1) 7 open-ended written questions 2) semi-structured focus group interview questions 2) the 30 items for PCAS and 7 items for PC scales from the pilot study in America
	Study 1B	2012 Spring	1) to see whether Korean college students differentiate cognitive autonomy support from other type of autonomy 2) to develop new scales to measure Korean students' different types of perceived autonomy in the classroom	1) 113 undergrads for EFA and CFA	Exploratory/ confirmatory Factor Analysis	1) 28 PCAS items from the original version 30 items, 2) 7 PC items, 3) 7 items from Assor et al.'s (2002), 4) 4 items from Tsai et al.'s (2008)

Table 1 continued

Study 2	Time 1	2012 Fall (beginning)	1) to explore how students' perceptions of the different types of autonomy support can be associated with the motivational construct of student interest, differentiated into situational and individual interest, mediated by different levels of cognitive processing.	260 undergrads in total	SEM (Structural Equation Modeling), using AMOS 18.0	Initial interest (in the College Writing Course)
	Time 2	2012 Fall (end)				In the final model, there were 1) 19 PCAS-K items 2) 3PC-K items 3) 4 Initial Interest items 4) 4 out of 5 Deep processing items 5) 3 out of Shallow processing items 6) 5 out of 8 Situational Interest 7) 4 out of 6 Individual Interest

Chapter 2

Review of the Literature

This chapter provides a review of the theoretical and empirical literature relevant to my study. It begins with a review of self-determination theory, moves to cognitive engagement including surface processing and deep processing and student interest, and then addresses the literature relevant to contextual factors. In the first section, I present an overview of self-determination theory, focusing on the need for autonomy among the three innate psychological needs and on autonomy-supportive *social contexts* provided by teachers. Next, I address the literature on different processes of cognitive engagement and different phases of student interest. Most importantly, I examine various types of autonomy support, emphasizing the effects of providing cognitive autonomy support on deep cognitive processing and student interest. Finally, I discuss the literature related to the contextual factors in this study.

Self-determination Theory

: The Importance of Autonomy and Autonomy-supportive Social Contexts

In common parlance, autonomy is defined as the "degree to which individuals feel volitional and responsible for the initiation of their behavior" (Williams, 2002, p. 235). However, not all the individuals feel autonomous in every situation. It is especially likely that some students may not feel autonomous in a classroom when taking a course that is important but not intrinsically interesting. They may pretend to listen and write, look around classrooms, stare at a clock on the wall, or even fall asleep. In such situations, educators often try to find ways to foster motivation in the process of internalization.

Many researchers have addressed the importance of boosting even extrinsic motivation revolving around the internalization process of external pressure or incentives. In an autonomy-supportive climate, this internalization process is said to be stronger. This section targets the literature on the construct of autonomy and its support in interpersonal social contexts.

The construct of autonomy has been addressed centrally by Deci and Ryan's (1985) motivational theory of self-determination. Self-determination theory (SDT) provides a route to understanding the relationships among basic human needs as these relate to, -motivation, cognition, and learning. According to SDT, people have "natural, innate, and constructive tendencies to develop an ever more elaborated and unified sense of self" (Ryan & Deci, 2002, p. 5). And human beings are said to be inherently proactive and engaged in response to various social-contextual conditions (Deci & Ryan, 1985; Ryan & Deci, 2002b). In this theory, innate human predispositions toward autonomy have been considered to facilitate or impede psychological growth and integration. These innate dispositions have often been discussed in relation to contextual factors. That is, the construct of autonomy cannot be considered separate from social or interpersonal climate.

Based on a large body of empirical research on the impact of *social contexts* as an external variable on self-determined motivation, SDT proposes that there are three innate psychological needs that are essential for integrated human functioning and that these basic needs may be fulfilled by an autonomy-supportive environment: competence, relatedness, and autonomy. *Competence* refers to "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and

express one's capacities" (Ryan & Deci, 2002b, p. 7). The feeling of competence encourages individuals to accept the challenge of more difficult tasks or situations and to build more skills or capacities. *Relatedness* refers to feeling connected to others, a sense of belonging to other individuals or to a community. *Autonomy* is the feeling of "being the perceived origin or source of one's own behavior" (Ryan & Deci, 2002b, p. 7).

These basic needs have been further explored in "mini-theories" within SDT. According to Ryan and Deci (2002), SDT is comprised of four mini-theories that share common characteristics in terms of organismic assumptions and basic psychological needs: cognitive evaluation theory (Deci, 1975), organismic integration theory (Deci & Ryan, 1985), causality orientation theory (Deci & Ryan, 1985), and basic needs theory (Ryan & Deci, 2000b). Among them, cognitive evaluation theory and organismic integration theory have been more critical than the other two, given a concern with autonomy and social contexts. Cognitive evaluation theory explicates the relationship between *autonomy-supportive social contexts* and *intrinsic motivation*. Organismic integration theory describes the process of internalization and integration of values, regulation, and *extrinsically motivated behaviors* related to uninteresting activities *with the help of significant others* such as teachers, parents, and close friends.

Cognitive evaluation theory. Cognitive evaluation theory (CET), presented by Deci and Ryan (1985), posits that the needs for competence and autonomy are related to intrinsic motivation, and that contextual elements such as social contexts are connected to human motivation (Deci & Ryan, 1980; Ryan & Deci, 2002). Most importantly, CET indicates that individuals are motivated differently according to whether social contexts

are perceived as autonomy-supportive or controlling. For instance, even though tangible rewards have been described as controlling in social contexts, they are not likely to undermine intrinsic motivation if they are given in a non-evaluative situation and in an autonomy-supportive way (Ryan, Mims, & Koestner, 1983). More recently, contextual factors associated with classroom community and course well-being have been focused in several studies in that they may strongly affect students' motivation, academic emotion, and cognition (Bush, 2006).

Organismic integration theory. Organismic integration theory (OIT) suggests that people have a propensity for integration and unity. According to this theory, internalization or integration occurs on a continuum, not as a dichotomous process. Extrinsically motivated behaviors can be self-determined or autonomous if they accompany integrated internal regulation. This means that students who do not feel interested in a task can behave in self-determined ways according to the different degrees to which their regulation has been internalized. From this view, competence, relatedness, and perception of autonomy play important roles in the process of internalization. That is, in order to promote integrated regulation, supports for these three elements are essential in a social context.

Ryan and Deci (2002) asserted that perceptions of autonomy play the most significant role in the process by transforming an external regulation into an individual's own self-determined one. That is, support for autonomy may be the most influential catalyst for the process of internalization (Williams & Deci, 1996). Depending on the degree of autonomy support, internalization can be partial (as in introjections, not fully

integrated yet) or much fuller (as in integrated regulation). According to this view, individuals are more likely to get involved in an activity and the internalization process, when they "experience a choice, volition, and freedom from external demands" (Ryan & Deci, 2002, p. 20). Accordingly, OIT sheds light on the effect of autonomy support by significant others such as teachers in school settings.

Autonomy-supportive teachers and environments can be regarded as supportive social contexts. To create this kind of social context, teachers should think about what they do and say in class. It has already been recognized that "what teachers do and say can have powerful effects on students' intentions for learning, subsequent learning behaviors, and academic engagement" (Stefanou et al., 2004, p. 97). That is, although a learner is viewed as the agent of learning process, teachers should be in control to help them lead their learning. In line with this belief, teachers' instructional strategies, motivational styles, and teaching practices have been shown to play a critical role in creating a safe and sound classroom environment and in facilitating students' fundamental needs and self-regulated learning (Svinicki, 2010).

Autonomy Support and the Provision of Choice

Again, Deci and Ryan (1987) defined autonomy as "action that is chosen; action for which one is responsible" (p. 1025). *Autonomy* is the experience of being the origin of one's behavior. In addition, the concept of *autonomy support* indicates that "an individual in a position of authority (e.g., an instructor) takes the other's (e.g., a student's) perspective, acknowledges the other's feelings, and provides the other with pertinent information and opportunities for choice, while minimizing the use of pressures and

demands" (Black & Deci, 2000, p. 742). As depicted here, autonomy support appears to be implemented in very inclusive way in the classroom. It is not confined to a single type of support. Teachers may provide students with opportunities to select something of their interest. They may help students with active cognitive reasoning by scaffolding knowledge construction along with pertinent information. By taking students' perspectives during classroom discussion seriously, they also show respect for students' ideas and guide them to create their own ideas freely. In this context, learners are more likely to feel comfortable in exploring many possibilities and to learn the ideas in depth.

After conducting empirical studies, some researchers have reported that teacher behaviors that are controlling are predictors of poor motivation and engagement regardless of gender. For instance, Assor, Kaplan, Maymon, and Roth (2005) demonstrated that directly controlling teacher behaviors (DCTB) such as "giving frequent directives, interfering with children's preferred pace of learning, and not allowing critical and independent opinions" arouse anger and anxiety in children, and that these negative emotions elicit a-motivation and extrinsic motivation, which finally result in restricted engagement rather than intensive academic engagement (p. 397, see Figure 1).

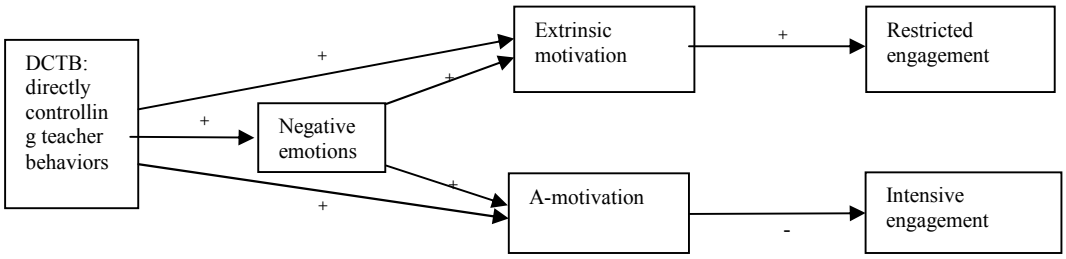


Figure 1. Emotions and Motivational Orientations as Mediators of the Effects of Directly Controlling Teacher Behaviors on Students' Academic Engagement (Assor et al., 2005, p. 406).

This finding strongly suggests that teachers' autonomy supportive behaviors can enhance positive outcomes in terms of students' emotions, motivations, and achievement.

Then, on the basis of the concept of autonomy support and its benefits, how can teachers best support autonomy? How can they help students experience feelings of autonomy and ownership, which facilitate both their active and independent construction of knowledge and interest development? What kinds of autonomy-supportive instructional strategies or behaviors have been implemented by teachers? One effective autonomy-supportive teacher behavior is to give students opportunities to choose something they value and to provide proper information in autonomous classroom settings in accordance with the students' needs and emotions. This procedure is commonly accomplished as a way to support students' autonomy in the classroom. For example, students may be encouraged to choose reading materials in relation to classroom activities, methods of assessment, or the topic to study (Flower & Schraw, 2000).

Interestingly, however, the meaning of *having choice* appears to have been used in various ways by researchers and educators. For example, some researchers have restricted the meaning of the provision of choice to giving options to choose specific tasks such as topics, reading materials, and specific classroom activities (Flowerday & Schraw, 2000). Others have used the concept of choice in a more inclusive way, including freedom to choose something and freedom to learn materials using different approaches and with enough time to solve problems (Connell & Wellborn, 1990). In a

sense, the ambiguous boundaries of different kinds of autonomy support have resulted in some confounding research findings.

In terms of the effects of having choice, both positive and negative impacts have been detected in many empirical studies. Reynolds and Symons (2002) reported that students are more likely to choose topics and classroom activities according to their own individual interest and background knowledge when they are allowed to choose from among several alternatives. Accordingly, they feel more enhanced responsibility for the task they choose, while behaviorally engaging in the activity. Also, Deci (1992) asserted that there is the positive effect of choice on interest within self-determination theory. In line with this belief, Schraw, Flowerday, and Lehman (2001) suggested that "choice increases feelings of self-determination by satisfying the need for autonomy. In turn, increased self-determination leads to increased intrinsic motivation, interest, and engagement" (p. 215).

By contrast, some educators and researchers have proposed that choice might have no effect or even negative effects on learning outcomes (Flowerday & Schraw, 2003; Mayer, 2004). For instance, Iyengar and Lepper (2000) suggested that too many choices are not necessarily more intrinsically motivating than fewer choices. According to their findings, participants reported that they were more satisfied with their choices and wrote better essays when the number of choices was limited. In addition, some researchers have criticized the role of choice without relevance. Also, some studies reported that having choice only minimally affects cognitive processes whereas it has

been positively associated with engagement and affective facets (Flowerday & Schraw, 2003; Schraw, Flowerday, & Reisetter, 1988).

Putting these contrasting findings together, the provision of choice can definitely be one effective way to support autonomy, but its effect can vary in different situations. Thus, some researchers have argued that there are different types of autonomy support that may result in different impacts on students' motivation and learning, searching for various autonomy-supportive instructional practices in real classrooms. I turn next to a consideration of other autonomy-supportive ways, other than the provision of choice in the classroom.

Autonomy Support and Cognitive Autonomy Support

The types of autonomy support students may experience in classroom activities can vary. Assor, Kaplan, and Roth (2002) demonstrated that both children and early adolescents could differentiate between three types of autonomy-enhancing teacher behaviors and three types of autonomy-suppressing teacher behaviors. Based on their analyses of students' answers to questionnaires, they emphasized the importance of teachers' role and their behaviors in supporting students' autonomy. With respect to autonomy-supportive behaviors, they suggested three types: (a) fostering a sense of personal relevance of schoolwork, (b) providing students with choices of tasks perceived as consistent with their goals and interest, and (c) allowing criticism and expression of dissatisfaction.

Assor et al. (2002) found that fostering relevance had more influential impact on students' perceptions of autonomy and their cognitive engagement than the provision of

choice. Result suggested that the provision of choice as one way to support students' autonomy should not always be considered to be the only major indicator of autonomy support. That is, simply providing students with choice does not result in students' perceptions of autonomy and a deep level of learning. Rather, teachers' autonomy-supportive behaviors to foster relevance are more important for both students' perceived autonomy and their behavioral and cognitive engagement in their study.

In line with this finding, Stefanou, Perencevich, Dicintio, and Turner (2004) have suggested that the meaning of *autonomy support* has often been falsely interpreted and implemented in teaching practices. They contended that the construct of autonomy support has been characterized by many researchers as the provision of (a) decision making, (b) rationales for the value of learning in an uncontrolled environment, (c) relevance of the learning, and (d) positive feedback about competence. However, from Stefanou et al.'s (2004) perspective, autonomy support has become synonymous with the provision of choice. Even worse, the provision of meaningless choices, not relevant to learning constructs or goals for learning or even irrelevant to students' interest or goals, has often been implemented by teachers in the name of providing students with autonomy. As a result, Stefanou et al. (2004) have argued, "the dominant view of autonomy support as one of offering choice may be too confining" (p. 100). Instead, they argued that autonomy includes cognitive choice as well as organizational and procedural choice.

Stefanou et al. (2004) proposed three distinct ways to provide autonomy support through the observation of seven 5^{th}- and 6^{th}- grade math classes: organizational

autonomy support, procedural autonomy support, and cognitive autonomy support. *Organizational autonomy support* encourages students' ownership of an environment; students can make choices over environmental procedures, such as developing classroom rules together, choosing the due dates of assignments, and choosing project group members. *Procedural autonomy support* encourages students' ownership of form and enables students to control the selection of media to present their ideas, such as making a graph or picture to illustrate a science concept. *Cognitive autonomy support* (CAS) encourages students' ownership of learning and allows them to have their own ways to justify and argue for their points, generating their own questions and solutions (see Table 2).

Table 2. Strategies Associated with the Different Features of Autonomy Support (from Stefanou et al., 2004, p. 101)

Organizational Autonomy Support	Procedural Autonomy Support	Cognitive Autonomy Support
Students are given opportunities to: Choose group members Choose evaluation procedure Take responsibility of due dates for assignments Participate in creating and implementing classroom rules Choose seating arrangement	*Students are given opportunities to:* Choose materials to use in class projects Choose the way competence will be demonstrated Display work in an individual manner Discuss their wants Handle materials	*Students are given opportunities to:* Discuss multiple approaches and strategies Find multiple solutions for the purpose of sharing expertise Have ample time for decision making Be independent problem solvers with scaffolding Re-evaluate errors Receive informational feedback Formulate personal goals or realign task to correspond with interest Debate ideas freely Have less teacher talk time; more teacher listening time Ask questions

Stefanou et al. (2004) asserted that CAS may intensify students' psychological investment and cognitive engagement as well as a deep level of thinking and learning. Organizational autonomy support may enable students to feel more comfortable in the social context and procedural autonomy support may promote students' initial engagement with learning activities. They concluded that classes with high organizational/ procedural and high cognitive autonomy support are ideal, and they proposed four types of instructional strategies with student responses according to different features of autonomy support (see Table 3).

Table 3. Examples from Mathematics Instruction and Different Features of Autonomy Support (Stefanou et al., 2004, p. 108).

Low O and P/ Low Cognitive	High O and P/ Low Cognitive	Low O and P/ High Cognitive	High O and P/ High Cognitive
Instructional directive: Follow along as I read Write this on your study sheet Remember this for the quiz All you have to do is move the decimal Memorize the pattern	Look at my model Predict percentage Calculate percentages Convert percentages to decimals and fractions Choose objects to create your project	Think about what it means to switch back and forth between decimals and percents If you understand that there are many approaches, you will always find a strategy that works Think about this for a while	You have lots of time to think about this and justify your thoughts Compare and contrast your ideas Choose the best idea that fits with the mathematical theory Explain how you were thinking to your peers Give me a different way you would approach this problem
Potential student response: Memorization	Copy the model	Offer many different approaches Share ideas with classmates	Each group has a different method Share mathematical experience with classmates Use errors to learn

Note. O=organizational; P=procedural.

According to Stefanou et al. (2004), organizational and procedural choices might be required but are insufficient for deep-level thinking and learning. In this sense, they

posited that CAS may play a pivotal role in students' engagement and learning itself. However, their proposition has not been empirically tested as of yet, although the positive impact of cognitive autonomy support can be confidently asserted on the basis of findings from qualitative studies and theoretical/ practical analysis. As the construct of cognitive autonomy support is not prevalent in the theoretical and empirical research literature, in the next section, I provide further details of this concept in general educational settings, in order to distinguish it from autonomy support.

Cognitive autonomy support

The term *cognitive autonomy support* (CAS) was introduced by Logan, DiCintio, Cox, and Turner (1995), who studied the relationship between teacher perceptions and observations of motivational practices in the classroom. They defined it as "confidence in one's ability to think independently in ways that may or may not be consistent with one's classmates but nonetheless render the material meaningful in a personal fashion" (p. 6). They concluded, based on classroom observations, that autonomy exists "not only as student choice and decision making (task autonomy), but also as *student ownership of ideas* and *student confidence and independence in thinking* (cognitive autonomy)" (Logan et al., 1995, p. 1). The following lesson they observed shows how the two types of autonomy support can coexist in the classroom:

> Ms. A: "You know it is pretty redundant to color in all of these scoops but if you would like to, you may. I have markers and colored pencils. Also, you may work with partners or alone. It is your choice. Again, if you truly want to color, that is fine, but can anyone give me a different way they might approach this problem?"

In this example, the teacher guides students through some procedures, and she enables them to explore and find their own way to approach the problem while providing choice regarding task autonomy.

Logan et al. (1995) valued *cognitive autonomy support* as an essential avenue for deeper thinking over *task autonomy support*, in that the former entices students into experiencing "higher cognitive processes" (p. 25) whereas the latter may lead to a "superficial sense of autonomy" for the student if it is implemented carelessly (Logan et al., 1995, p. 6). Logan et al. (1995) observed Ms. A's math classroom where students explained their own processes and products to their classmates using an overhead projector, and demonstrated their many approaches to solving problems such as coloring, diagrams, and algorithmic equations. Logan et al. (1995) also noted that students in the classroom were required to agree or disagree with their classmates' methods of approach, and to explore why one approach was better than another. According to the teacher's guiding questions and the students' various opinions, students were allowed to find some errors and solutions in the activities, either individually or collaboratively. Thus, students' various creative ideas were not criticized by others in a CAS condition; rather, their thoughts were respected by others. Students were allowed to create their own ideas, and shared their own points with others freely to be elaborated on and refined in the process of learning.

Accordingly, the support for cognitive autonomy may be differentiated from other types of autonomy support even though they share many common features. For example, Tsai, Kunter, Ludtke, Trautwein, and Ryan (2008) postulated "whereas autonomy-

supportive climate and controlling instruction focus on social interaction, cognitive autonomy support (CAS) emphasizes the support provided for students' engagement in cognitive activities" (p. 462). The differences may be seen by examining the items of the two scales Tsai et al. (2008) used in their research. For instance, there were some items measuring *perceived autonomy-supportive climate*, including having choice: "I felt that my teacher provided me choice and options," "I felt understood by my teacher," "My teacher conveyed confidence in my ability to do well in the course," "My teacher encouraged me to ask questions," and "My teacher tried to understand how I see things before suggesting a new approach" (p. 472). And, in terms of the items concerning *perceived cognitive autonomy support*, questions were more likely to focus on cognitive functioning and process: "We worked through exercises that helped us understand the topic," "Different students presented their solutions to the same task," "Our teacher set tasks that required time to reflect," and "Our teacher emphasized the relations between the topics discussed" (p. 472).

Accordingly, autonomy support seems to consist of more inclusive components, including both social interaction between teachers and students and the provision of choice. CAS, on the other hand, seems to focus on how students' ownership of ideas and decisiveness result in thoughtful justification of ideas and self-reliance, in accordance with their own cognitive processing to create meanings in autonomy-supportive environment. In this respect, CAS, as one example of autonomy support, might be influential in facilitating deep-level thinking and learning.

Cognitive Processing and Engagement

Once motivational factors are in place, cognitive aspect is critical for learning. It is believed that "motivation and cognition are key determinants of student engagement" in academic fields (Stefanou et al., 2004, p. 97). Many researchers have studied the impact of motivation, student interest, on cognitive or behavioral engagement. However, their relationship is considered to be reciprocal in this study, considering that Hidi and Renninger (2006) emphasized the impact of cognitive aspect of engagement on the development of student interest. Most of all, cognitive engagement is referred to cognitive *processing* encompassing cognitive study strategies in the study, differentiated into two interconnected but different two levels. Thus, cognitive processing would be understood through the concept of cognitive engagement here.

In general, engagement provides relatively "observable manifestation of the quality of a student's motivation," whereas interest as a motivational variable is not easily observable (Reeve, 2002, p. 194). This can be interpreted to mean that engagement would be one of the indicators of students' feelings of interest in educational situations. Engagement has been described as having several dimensions. For example, in Finn's (1989) model, it comprises two dimensions: behavioral (participation in class and school) and affective (school identification, belonging, valuing learning). Some researchers have discussed three components of engagement: behavioral, cognitive, and emotional engagement (Jimerson, Campos, & Grief, 2003). In the following section, I discuss surface and deep processing aspects of cognitive engagement.

Cognitive Engagement

Learning includes the "active *process* of integrating and organizing new information, constructing meaning, and monitoring comprehension in order to develop a sound understanding of a subject matter" (Meece, Blumenfeld, & Hoyle, 1988). These characteristics of learning are associated with students' cognitive/ metacognitive processing. Active cognitive processing is associated with cognitive engagement. Therefore, in this study, cognitive engagement is measured through two different levels of cognitive processing such as surface processing and deep processing.

Cognitive engagement has been recognized as one of the most significant factors in knowledge acquisition and in-depth learning, contributing to "constructing new understanding and knowledge" (Zhu, 2006). It refers to "the extent to which students are attending to and expending mental effort in the learning tasks encountered (e.g., efforts to use knowledge and cognitive strategies to complete a task)" (Zhu et al. 2009, p. 222). It subsumes "students' willingness to invest and exert effort in learning, while employing the necessary cognitive, metacognitive, and volitional strategies that promote understanding" (Blumenfeld, Kempler, & Krajcik, 2006, p. 475). Cognitively engaged students tend to engage in deep cognitive processing thereby eliciting a solid understanding of the materials. Such students show more motivated behaviors associated with their interest and persistence over time, using effective cognitive strategies (Pintrich & Schrauen, 1992).

Commonly, cognitive engagement has been divided into two different levels, "meaningful cognitive engagement" and "shallow cognitive engagement" (Greene &

Miller, 1996, p. 185). Although these levels of engagement are hard to differentiate clearly from each other in many cases because they tend to be intercorrelated, it is said that meaningful cognitive engagement includes the use of self-regulated strategies such as elaboration and organization to connect new ideas to preexisting ones whereas shallow cognitive engagement is commonly concerned with simple memory strategies. Taken together, cognitive engagement is believed to produce the best learning outcomes (Logan et al., 1995).

In the current study, both surface processing and deep processing as indicators of different levels of cognitive engagement and study strategies were used. The scales were revised from those used by Elliot, McGregor, and Gable (1999).

In surface processing, the scale includes the following comments: “When studying for this course, I read the text and my notes over and over again to help me remember the material,” and “I study for this course by memorizing the definitions at the end of each chapter of the text.” Such responses are more likely to be associated with rote memory or simple calculation. To measure deep processing, the instrument contains the following statement: “I treat the course material as a starting point and try to develop my own ideas about it.” That is, deep processing pertains to thinking through topics and deciding what the learner wants to lean volitionally.

Interestingly, cognitive engagement can also be affected by environmental factors as well as individual differences. For instance, some theorists have reported that controlling conditions may make it difficult for some students to feel safe and autonomous. In those situations, students may become more competitive and

performance-oriented and may not fully cognitively engage in learning (Meece et al., 1988). Accordingly, several researchers have discussed the positive effects of autonomy support on engagement. Some empirical studies have examined the provision of choice as a way to provide autonomy support for cognitive engagement (Flowerday, Schraw, & Stevens, 2004). There have also been contradictory findings, however. For example, Flowerday and Schraw (2003) demonstrated that choice had no positive effect on cognitive engagement. I hoped with my study to integrate some confounding research findings? And to investigate what other kinds of autonomy-supportive behaviors can effectively facilitate students' cognitive engagement.

The Effect of Cognitive Autonomy Support on Cognitive Engagement

Reeve (2009) noted that teachers' autonomy support might provide students with educational benefits such as "conceptual understanding, deep processing, active information processing, and self-regulation strategies" (p. 162). What Reeve was describinb here might be connected to what Stefanou et al. (2004) referred to as *cognitive autonomy support* (CAS), in that cognitive autonomy support enhances students' deep level thinking, advanced learning strategies, and self-regulation.

Rotgans and Schmidt (2011) examined how different levels of autonomy in problem-based learning (PBL) elicit cognitive engagement as cognitive processing with the topic at hand. Furthermore, they demonstrated how cognitive engagement as a function of the learning process may develop and how cognitive engagement determines subsequent levels of cognitive engagement. According to their perspective, being autonomous from the direct intervention of a teacher and feeling in charge of one's own

learning may lead to increased cognitive engagement with the topic, thereby encouraging deeper understanding. Even though they were not distinguishing different types of autonomy support in their study, they were focusing on a cognitive facet of autonomy support in that the experiment was conducted in the setting of self-directed, problem-based learning, a form of instruction that encourages active cognitive processing on the part of students.

Logan et al. (1995) posited that "cognitive autonomy" induces "cognitive engagement" that produces the best learning outcomes, unlike "task autonomy" such as simple choice concerning tasks. In line with this idea, Stefanou et al. (2004) asserted that, although choice and decision-making are fundamental to motivation and learning, more than simply providing choice about tasks is necessary in order to help students become more cognitively engaged in learning. That is, in classrooms characterized as having much cognitive autonomy-supportive, students are more likely to be cognitively engaged as their interest develops. Accordingly, the relationship between CAS and cognitive engagement must be studied to understand better whether cognitive autonomy-supportive contexts or teacher behaviors influence cognitive performance and student interest.

Interest

Deci and Ryan (1985) described interest as having "an important directive role in intrinsically motivated behavior in that people naturally approach activities that interest them" (p. 34). From this perspective, the construct of interest can be interpreted as a requisite for intrinsically motivated behaviors. Meanwhile, Hidi and Renninger (2006)

defined interest as "a psychological state of engaging or the predisposition to reengage with particular classes of objects, events, or ideas over time" (p. 112).

The Characteristics of Interest

As Renninger and Hidi (2002) argued, there has been a great deal of research over the last 20 years on the construct of student interest, equating it with positive affect. The problem with this research, in their view, is that inconsistent conceptualization and measures of interest have caused contradictory findings. Also, research on interest has more often focused on affective aspects of the construct. Renninger and Hidi posited that there are different types of interest that students hold for a subject content over different phases of interest development. That is, student interest pertains to ongoing involvement with a specific subject matter. Also, some students may feel interested only in initial contacts with an activity or a topic. Based on these issues, this section describes the literature on the construct of interest as related to my study.

Interest is domain-specific. As Schiefele (1991) proposed, interest is a domain- or content-specific construct. Interest is regarded as a psychological state arising from the interaction between an individual and "a particular content" (Hidi & Renninger, 2006, p. 112). This indicates that the feeling of interest in a subject pertains to a specific "content." Hidi and Renninger (2006) argued that interest is always content-specific and that it does not apply to all activities. This feature implies that teachers teaching specific domain knowledge should focus on enhancing students' interest in the specific *content*. This idea parallels Schiefele's (1991) suggestions that "subject-matter-specific interest is probably more amenable to instructional influence than are general motives or

motivational orientations" (p. 301). The reason the construct of student interest is relevant to this study is that data were gathered from students who are taking a college writing course, a specific content area.

Keeping this in mind, some specific characteristics of the construct of student interest will be presented in the following section. These features provide some possibilities or clues for teachers or any educators as to their potential role in helping student interest develop in a specific subject

Interest has a cognitive as well as an affective aspect. Recently, interest has been reported to have both affective and cognitive facets; this idea is supported by theoretical and empirical research (Hidi, Renninger, & Krapp, 2004; Panksepp, 2003). The *affective facet* refers to "positive emotions accompanying engagement" such as enjoyment and pleasure, whereas the *cognitive facet* stands for "perceptual and representational activities related to engagement" (Hidi & Renninger, 2006, p. 112). In their early studies, Schank (1979) and Kintsch (1980) distinguished interest related to emotion and feelings from interest as an outcome of cognitive processing. Building on this differentiation, Harp and Mayer (1997) demonstrated that two different sources of situational interest cause different types of processing. They found that seductive texts for increasing emotional interest did not affect the improvement of understanding, whereas coherent texts for increasing cognitive interest did increase comprehension and learning.

Affective and cognitive facets have also been viewed as interacting with each other, even though they have been considered as separable. Hidi, Renninger, and Krapp (2004) noted that interest is a motivational variable that combines affective and cognitive

components. In their view, the two components are not contradictory. Rather, they may vary as interest develops. For example, individuals may experience affect at the beginning of an activity; the affect can be gradually integrated with cognitive processing based on its value or relevance.

Thus, the first phase of interest development, a *triggered situational interest*, which will be described in detail in the following section, may have a relatively less amount of cognitive evaluation along with more positive emotion (affect), whereas the last phase, a *well-developed individual interest* in a specific domain, subsumes "both stored knowledge and stored value, as well as positive affect" (Hidi et al., 2004, p, 95). By persistently building up the cognitive components, students might have a more developed interest level over time, suggesting that teachers should design learning environments that stimulate their students' cognitive process in learning and guide students' cognitive performance.

Interest develops: A four-phase model of interest development. Interest can change over time through interaction with an environment and the external stimuli. From the developmental perspective on interest, Hidi and Renninger (2006) proposed a four-phase model of interest development, from situational interest to individual interest.

Hidi and Renninger's (2006) model of interest development posits four sequential phases: triggered situational interest, maintained situational interest, emerging individual interest, and well-developed individual interest. In other words, the model describes two representative phases of situational and individual interest with affective and cognitive components in each phase. To date, situational interest and individual interest have been

identified in several studies (Hidi, 2000; Krapp, Hidi, & Renninger, 1992; Schraw, Flowerday, & Lehman, 2001). Mitchell (1993) ascertained that the primary distinction of the interest construct originated in work on personal and situational interest by Hidi and Baird (1988) and Krapp (1989). Here, a *personal interest* refers to interest individuals bring to some environment regardless of the environmental stimuli in a certain situation, whereas *situational interest* refers to an interest individuals can obtain through interaction with environmental factors.

Building on previous studies, Hidi and Renninger (2006) defined situational interest as "focused attention and affective reaction" initiated by external stimuli, whereas individual interest refers to "a person's relatively enduring predisposition to reengage particular content over time as well as to the immediate psychological state when this predisposition has been activated" (p. 113). In other words, situational interest can be triggered either by something intriguing, such as text features like surprising new information, concreteness, or funny pictures in the environment at the moment, or by a situation created by teachers or peers in a context. By contrast, individual interest has a dispositional feature in a person across situations. For example, some students bring their extant interest in reading books to a class regardless of instructional stimuli in the situation (Linnenbrink-Garcia, Durik, Conley, Barron, Tauer, Karabenick, & Harakiewicz, 2010).

Situational interest (SI) is differentiated into two phases: "triggered situational interest" and "maintained situational interest." Individual interest (IN) comprises "emerging individual interest" and "well-developed individual interest." According to

Hidi and Renninger (2006), each phase of interest varies according to "amount of affect, knowledge, and value" (p. 112). Of course, other factors such as different levels of effort, self-efficacy, and goal setting have also been found to affect each phase of interest development (Renninger & Hidi, 2002). In addition, each phase of feeling interested can be supported by external stimuli. Whether interest is supported by others, or maintained by students themselves through effort and challenge, it is believed to develop and become robust over time in interacting with external support and contexts. This possibility enables educators to create a variety of supportive environments when they teach.

Although there are overlapping components, each phase of the model of interest development has its own characteristics. In the first phase, *triggered situational interest*, individuals may become fascinated by an activity such as group work on computers or course material. In these situations, students may feel triggered situational interest, which occurs from "short-term changes in affective and cognitive processing" (Hidi & Renninger, 2006, p. 114), triggered by situational or environmental stimuli in the moment and commonly supported by external factors. Therefore, learning environments or various instructional tools can help prompt triggered situational interest. Many researchers have articulated that teachers' provision of choice in classroom activities tends to trigger students' situational interest (Flowerday et al., 2004; Schraw et al., 2001). Schraw, Flowerday, and Reisetter (1998) found that students given choices about what to read reported more situational interest. This triggered situational interest by external environment may develop into maintained situational interest if the individuals try to reengage particular content over time with persistence and focused attention.

The second phase, *maintained situational interest*, refers to a psychological state of interest following a triggered one, sustained by task meaningfulness (more likely value-related) and personal involvement as well as positive feelings (more likely feeling-related) (Mitchell, 1993). Such interest can also be supported externally. As Linnenbrink-Garcia et al. (2010) argued, learning contexts can promote maintained situational interest if they prompt students to feel empowered by the *knowledge* in the situation. For instance, learning environments that foster meaningfulness and personal involvement through project-based group work can help students to maintain their situational interest.

These two phases of situational interest parallel Mitchell's (1993) model of *catching* and *holding* interest. Citing the works of Berlyne (1960) and Malone and Lepper (1987), Mitchell (1993) demonstrated that "*catching interest*" emerges through sensory stimulation by attention-attracting values of the sensory environment and "cognitive stimulation" of so-called cognitive equilibrium or the cognitive drive to know. For instance, he suggested that group work, computers, and puzzles in a math class can elicit "catching interest" in that situation. On the other hand, "*holding interest*" can be characterized as sustained by "meaningfulness" and "involvement." That is, if teachers can make learning material meaningful to help students achieve their own goals, the students can maintain their initial interest in the particular content. Moreover, he argued that although students can bring different personal interest to class, their personal interest levels also can be changed and supported by external support in a situation. These two phases of situational interest support the development of individual interest (Renninger, 2000; Schraw & Lehman, 2001). However, the transition from situational interest to

individual interest does not occur naturally in every situation (Hidi & Renninger, 2006). Situational interest can fade away unless the environment continues to support it, or if the individual invests less effort and value in a particular domain.

The third phase is *emerging individual interest*, which refers to a "psychological state of interest as well as to the beginning phases of a relatively enduring predisposition" to reengage with particular content over time (Hidi & Renninger, 2006, p. 114). *Emerging individual interest* is distinguished from the two previously discussed facets of situational interest in that it is characterized by "stored knowledge" and "stored value" as well as by positive feelings. In this phase, a relatively large amount of cognitive processing and evaluation seems to take place. Also, in this stage, students have a tendency to generate their own questions out of their curiosity about a specific content. Although students in this phase are more likely to be self-regulated, they also can be influenced by external support of instructional conditions. Such support from teachers, peers, and experts helps them with in-depth understanding and learning (Krapp & Lewalter, 2001). Depending on the amount of value, knowledge, and affect, this phase of interest may or may not develop into the next phase of interest.

If individuals have a relatively enduring predisposition to reengage with a particular content for a long time, they might have *well-developed individual interest*, which is the fourth phase of interest development. This type of interest includes more stored knowledge and more stored value as well as positive affect. Based on their previous level of engagement, students value the specific task and reengage with it. Students in this phase are apt to generate and pursue answers to the questions they have

and to sustain constructive and creative effort over time, along with more self-regulated learning strategies. Like other phases of interest, it also benefits from external support even if it is likely to be self-generated. Thus, learning environments facilitate the deepening of well-developed individual interest by providing more cognitively challenging situations.

Hidi and Renninger (2006) postulated that "the characteristics of each phase of interest may be considered mediators of subsequent development and the deepening of interest as well as outcomes of previous development" (p. 115). In sum, given the characteristics of its four phases, the model of interest development proposes several interesting and meaningful points were examined in my study. First, situational interest can be maintained and develop into individual interest, a better-developed or integrated type of interest, by an increase of cognitive processing such as the accumulated value of the tasks, knowledge, self-regulation, and deeper understanding. Second, learning environments and instructional strategies serving as external support allowing for active cognitive functioning can facilitate interest development in each phase. These two critical rationales support the present study by allowing for the examination of the effects of cognitive autonomy support on individual interest through active engagement.

Effect of Cognitive Autonomy Support on Individual Interest through Deep Processing of Cognitive Engagement

The present study explored on path to boosting student interest. This research focus came from the very close relationship between autonomy support and student interest. Despite several controversies, it has been reported that an autonomy-supportive

environment can enhance students' interest (Deci, 1992; Flowerday, 2000; Schraw et al., 2001). According to Reeve (2002), *autonomy support* means "teaching in ways that nurture students' intrinsic motivation and internalization processes" (p. 190). In addition, some researchers have examined the effect of autonomy support on engagement (Shernoff, Csikszentmihalyi, Schneider, & Shernof, 2003). With respect to the close association between autonomy support and engagement, Reeve (2002) postulated, "engagement arises from experiences in which one's psychological needs for self-determination, competence, and relatedness are met (Connell & Wellborn, 1991). However, there is little research combining these variables together, exploring the cognitive facets of motivation that may be fostered by autonomy support.

When looking at the importance and also limitations of autonomy support, it is important to study which types of autonomy support will yield different types of motivational and cognitive learning outcomes. As previously addressed, some researchers have asserted that not every type of autonomy-supportive methods will enhance engagement, interest, intrinsic motivation, and learning in the same way. If so, the question becomes what kind of autonomy support will more positively affect students' interest at the end of the semester.

According to Stefanou et al. (2004), cognitive autonomy support (CAS) enables students to be more autonomous cognitively, to think in various ways, and to engage in in-depth learning, by facilitating cognitive processing, from memorizing to creating questions and thoughts. The cognitive facet enhanced by CAS may more strongly predict individual interest at the end of the semester, along with more meaningful value and

stored knowledge, and intensifying cognitive processing rather than affective processing (Hidi & Renninger, 2006). Hence, this study was an attempt to combine the potential impact of two types of autonomy support on two different levels of cognitive engagement and the mediating effect of cognitive engagement on two different phases of student interest. Because I believe that student interest may become more solidified along with ongoing cognitive processes, processes that can be supported by teachers, I explored in this study how the deep level of cognitive functioning may be intensified in autonomy-supportive contexts and may be associated with more in-depth cognitive engagement and finally interest. I expected that cognitive autonomy support might be associated with deep levels of cognitive engagement, referred to as *deep processing*, and predict students' individual interest at the end of the semester.

Cultural Factors in the Study

As introduced in the first chapter, the study examined how different types of autonomy support are interrelated with different phases of student interest, with Korean undergraduate students. Although any possible differences in cultures are not research questions in this study, how Korean students perceive autonomy was examined in a first study using scales that measure autonomy-related constucts developed with American students. That is, specific comparison between two different cultures would be conducted in the near future study. Yet, the procedure was needed, because the scales used in my study needed to be appropriate for the students.

Many cross-cultural researchers have highlighted the association between cultural values and motivation. For example, self-determination theory has often been

investigated in different cultures, searching for the generalizability of the theory. Although Ryan and Deci (2000) posited the importance of autonomy support in motivation and academic achievement across cultures, many researchers have reported contradictory findings. Thus, some researchers have questioned the generalizability of the theory in that most data have been collected in the United States and that different cultures represent different cultural norms and dynamics valuing interdependence rather than independence (Markus & Kitayama, 2003).

Thus, Iyengar and Lepper (1999) examined the link between the provision of choice and intrinsic motivation with both Asian American and Anglo American children enrolled in two schools in the United States. According to the findings, Anglo American children showed more enhanced motivation when they had opportunities to choose between activities in comparison with Asian Americans. In other words, they demonstrated that there were cultural differences in terms of the effect of having choice on motivation, proposing a possibility that Western motivational theories may be more culturally specific and that different cultural ideals may shape different motivational predispositions.

Recently, however, some cross-cultural findings appear to support the positive impact of autonomy support, as a way to meet fundamental and essential needs, on motivation and achievement. For instance, Hui, Sun, Chow, and Chu (2011) argued that both autonomy support and the three innate fundamental needs of competence, autonomy, and relatedness were more critical predictors of high levels of academic achievement of

Chinese adolescents than filial piety, articulating the generalizability of what Ryan and Deci (2000) proposed across cultures.

Similarly, in a study to examine subjective well-being in four cultures including China, South Korea, Taiwan, and the United States, Sheldon, Elliot, Ryan, Chirkov, Kim, and Wu (2004) found that high levels of relative autonomy positively predicted subjective feelings of well-being across the four cultures. Likewise, Jang, Reeve, Ryan, and Kim (2009) tested the cross-cultural generalizability of self-determination theory with high school students in South Korea and concluded that the three fundamental needs from self-determination theory were strongly associated with positive emotions and satisfying learning experiences. Taking recent research findings into account, I assumed that the three fundamental needs posited in self-determination theory are positively associated with enhanced motivation, well-being, course-satisfaction, and academic achievement in different cultures. However, the findings conducted across different cultures need to be considered with caution in that students' self-report of what they value and appreciate may not necessarily be identical with what they actually experience in class.

For example, a student might think that having autonomy in class is critical to his/ her learning but he/she might feel organized and satisfied in a controlling classroom environment. Similarly, Kim, Schallert, and Kim (2010) reported that Korean students in a middle school and a girls' high school adopted mastery goals that were predicted by their perceptions of both their parents' autonomy supportive and controlling motivating styles. Likewise, students may consider teacher-centered controlling environment as

structured and productive. More interestingly, what American students feel is autonomous may not necessarily be the same as what Korean students perceive as autonomy. In addition, due to lack of attention to different types of autonomy support, how students perceive and experience many kinds of autonomy support including cognitive autonomy support needs to be investigated in many cultures. Given the necessity of more careful examination, therefore, the following chapters provide details of Study 1, presented in two parts, and Study 2.

Chapter 3

Study 1A

Purpose

The purpose of Study 1 was the development of new scales for the main study, Study 2. To this end, Study 1 included two phases, Study 1A and Study 1B, with the purpose of (1) investigating how the idea of different types of autonomy could be explicated or defined in Korean educational settings (Study 1A), (2) checking on whether the hypotheses of Study 2 testing the relationship between various kinds of autonomy support and student interest were feasible through a qualitative study (Study 1A), (3) exploring whether the original version of both PCAS and PC scales generated in an American setting would be applicable to a Korean educational context (Study 1A and Study 1B), and finally (4) developing new scales, which I called PCAS-K and PC-K, so as to examine through factor analysis whether and how Korean undergraduates perceived and experienced different types of autonomy support given in class (Study 1B).

This chapter addresses Study 1A. The goal of Study 1A was (1) to explore how Korean undergraduates experience and perceive their teachers' autonomy support in the classroom and (2) to modify or trim items taken from previously developed scales (the PCAS and PC scales) to make them applicable to Korean educational settings before the Study 1B phase. Study 1A itself had two sequential subphases. In the first subphase, participants were asked to respond to seven open-ended written survey questions. In the second subphase, students participated in a semi-structured focus group interview session.

Study 1A was a qualitative study in nature, using open-ended written questions and a focus group interview. This study was critical for the following reasons. First, it has been recommended that a researcher should define the construct clearly as the first step for scale development on the basis of both existing theory and research for sound conceptual foundation (Worthington & Whittaker, 2006). Exploring the meaning or definition of the construct of perceived cognitive autonomy in a new setting, the procedure for anchoring items as appropriately as possible was essential. In other words, in cases in which an issue or problem has not been examined before, it is recommended that a qualitative study be conducted to examine multiple realities relevant to the problem (Guba & Lincoln, 1994).

Second, related to the first reason, a possibility was considered that the PCAS and PC items- my colleague and I had developed in America in a pilot study- might not match with Korean students' experiences and perceptions because Korean undergraduates may experience and perceive teachers' autonomy support in a different way due to different cultural norms and academic environments (Boykin, Tyler, & Miller, 2005; Purdie & Hattie, 2010).

For instance, they might perceive a situation where an instructor gives them freedom to think in different ways as unstructured and disorganized rather than as autonomy-supportive because of their past educational experiences of teacher-centered organized instruction focused on producing correct answers. Or they might have experienced less provision of choice as one way to support autonomy support in the classroom.

Moreover, some literature reported that there might be a moderate degree of differences in terms of thinking and cognitive styles between Asian and Western cultures representative of collectivism and individualism respectively (Oyserman, Coon, & Kemmelmeier, 2002; Oyserman & Lee, 2008). These fundamental and subtle differences, which would affect how to define the construct and how to develop instruments measuring students' perceptions of different types of autonomy support in class, were considered significant in my study because the construct of cognitive autonomy support had not been explored in Korean educational contexts.

Method

Participants

Participants in the first subphase of Study 1A were 29 undergraduates who were recruited from two different large universities in Seoul, Korea at the beginning of spring semester of 2012. The reason I was interested in higher education settings was that I assumed there would be more variety in the kinds of instructional practices in higher education classrooms as compared to secondary level classrooms. Among the 29 students, 10 were from one large university (named University A in my study), in which students had relatively higher entrance exam scores. They were recruited through online advertisement. With respect to their majors, six specialized in the humanities and the rest were majoring in the natural sciences and social sciences. With the help of one of my colleagues who worked as an instructor at another large university (named University B), another group of 19 undergraduates having slightly lower entrance exam scores agreed to participate. All the students from University B were majoring in the Humanities. The

second group was recruited in order to see if the codes I had developed would be applicable to another group of students with slightly different academic histories. If there were any salient differences, I planned to report them in my results.

The 29 agreed to join Study 1A and signed consent forms. They were paid the equivalent of 10-dollars in Korean currency in return for their participation. They were all women. In terms of this homogeneous gender group, as Morgan (1997) mentioned, group members may voice their opinions more in homogenous settings. In terms of classification, 28% (n=8) were freshman, 48% (n=14) were sophomore, 17% (n=5) were junior and 6% (n=2) were senior. All of them were assigned numbers. The two groups were asked to answer the seven open-ended questions in separate lecture rooms, following a short introduction.

In the second subphase of Study 1A, participants were 10 students from University A. They agreed to participate in a focus group interview after the first phase. The relatively small sample size for the second phase was considered adequate and optimal to elicit in-depth illustration and to examine unexplored constructs (Foss & Ellefsen, 2002).

After the focus group interview, the 10 students were also encouraged to read carefully the original PCAS (30 items) and PC (7 items) 37 items in total, translated into Korean by two professional bilingual translators for the second phase of Study 1A. They were asked to modify any awkward Korean expressions that they felt were inappropriate for a Korean educational setting at the university level.

Procedures

Study 1A involved two phases. In the first phase, 29 students were asked to sign the consent form and to answer both demographic questions and seven open-ended questions. This session was designed to see how students, without specific knowledge of the construct, experienced and perceived an instructor's autonomy support during classroom activities, using their own words (Neff, 2003).

Their answers to the seven questions allowed me to contemplate deeply the term *autonomy* and the different types of autonomy reflected on PCAS and PC items from the pilot study version of the scales. The 29 students were asked to think about any course they had taken and to answer the seven open-ended written questions about their experiences, perceptions, and beliefs in the classroom in relation to instructors' various types of autonomy support they had experienced.

Open-ended Written Questions for the First Phase of Study 1A

The questions were as follows:

Q 1: From your own perspective, what is the feeling of freedom or autonomy that can be given by an instructor in a lecture room?

Q 2: What kinds of autonomy or freedom have you actually experienced in class?

Q 3: In which case did you feel free or autonomous in terms of your behaviors?

Q 4: In which case did you feel free or autonomous in terms of your thinking or cognition?

Q 5: Among various kinds of autonomy given by an instructor in class, which one do you think impacts your feeling of interest more positively between the freedom/autonomy of 'behaviors' and the freedom/autonomy of 'thinking'?

Q 6: Between the two kinds of freedom or autonomy, which one do you think is more worthwhile?

Q 7: Between the two above, which do you believe influences your emotion or affect more positively?

Two different bilingual colleagues translated these questions into Korean (Appendix), and students answered in Korean. Students were given about 30 minutes to answer these questions. They were asked not to read through all the questions and not to go back to previous questions to rewrite what they had responded because some specific terms or words presented in the following questions could function as a cue for their other answers, presumably affecting the results of this study negatively.

For example, the first question (Q1) asked about their ideas about autonomy in the lecture room, that is, their own definition about autonomy in the classroom. I expected that I could obtain meaningful and natural data about students' perceptions and their experiences about different types of autonomy or its support given by instructors. In both the third (Q3) and the fourth (Q4) questions, students were asked about their feelings of autonomy in terms of their own "behaviors" and "thinking or cognition." If reviewing the previous questions was allowed, some participants might revisit and even modify their answers, affected by Q3 and Q4, when they responded to Q1. That is, I requested they not go back in order to prevent any possible contamination of their answers.

In the second phase of Study 1A, 10 students from university A agreed to participate in a semi-structured focus group interview session for about 30 minutes

immediately after they had completed the first phase of Study 1A. All the talk was voice recorded. The objectives of this second phase were to clarify and amplify what they had answered in the open-ended survey questions in the first phase for member checking purposes as recommended by Creswell (1998). The group interview was to elicit information from the group members' active interactions, and to triangulate all the data from the first phase for the improvement of trustworthinss.

After a very brief introduction and comment about the study, I asked several questions about any memorable experience in class in relation to their feelings about or experience of freedom or autonomy, consistent with the seven questions they answered in the first phase to allow them to elaborate their answers.

Some leading questions were as follows: "What do you think about autonomy or the feeling of freedom you can have in class?" "What kinds of choice have you experienced in class?" "What kinds of support do you feel you are receiving from your instructor to foster your ownership of your learning?" "When do you feel free in your thinking and making meaning during classroom activities?" "When do you think you are the origin of your own learning or thinking in class?". Having individually reflected on each question or idea, they were then asked to share their own experiences and discuss what they had experienced in the group, providing some detailed examples in terms of their perceptions to the whole group.

After the focus group interview, they were guided to read carefully both the 30 PCAS items and seven PC items and requested to mark any confusing expression or item when written in Korean. This step was necessary because the items had been translated

into Korean from an original English version. Even though the Korean version was constructed through the process of back translation with the help of two fluent bilingual translators, following Brislin's (1980) guidelines, I expected that some terminology and words might need to be modified for applicability to Korean educational settings.

Also, the focus group participants were asked to group relevant items together and to say what the items meant so as to check whether the items were measuring the constructs as theoretically defined through literature and the pilot study. Next, they were requested to write down what they thought the instrument tested or measured. They were expected to provide feedback on the items with respect to their comprehensibility. These procedures were helpful for face validity. Next, they listened to my explanation about the main ideas behind each item. They read each item again and gave me some feedback as a whole group. Based on their feedback and modification, I modified some of the items a little mainly in terms of honorific forms of language. Some course-specific words or phrases were also revised and adapted for the Korean educational context.

Data Analysis

From a constructive perspective, constant comparative analysis was used for data analysis. According to Corbin and Strauss (2008), comparative analysis refers to "comparing incident against incident for similarities and differences. Incidents that are found to be conceptually similar to previously coded incidents are given the same conceptual label and put under the same code. Each new incident that is coded under a code adds to the general properties and dimensions of that code, elaborating it and

bringing in variation" (p. 195). The data analysis of both open-ended question analysis and focus group interview data in Study 1A was inductive and interpretive.

Lincoln and Guba (1985) proposed four criteria for trustworthiness of the data in qualitative research: credibility, transferability, dependability, and confirmability. In particular, I focused on two techniques establishing *credibility* to strengthen confidence in the "truth" of the findings: triangulation and member checking. *Triangulation* refers to using multiple and different data sources, methods, and even theories to ensure that an account or story is comprehensive, rich, and well-developed. In order to see how/whether Korean undergraduates perceived and experienced different types of autonomy support in class, I first collected different types of data such as answers to open-ended written questions from groups with different academic achievement levels from two different universities and focus group interview data. Also, member checking was used to establish credibility in the second phase of Study 1A through the focus group interview. In spite of some controversies, Lincoln and Guba (1985) posited member checking as the most crucial technique for credibility.

Thus, regarding trustworthiness, the data included multiple forms of data, involving both the open-ended questions with different groups from two different universities and focus group interview data to corroborate all the findings until all the categories and themes were saturated. Additionally, I did open coding to break data apart again two weeks later with raw data to check whether the initial codes created were consistent with the codes generated two weeks later. With respect to the unit of analysis, participants' answers to the seven questions were coded in the first phase. In some cases

of survey responses, participants reported more than one type of autonomy or freedom in class they thought of or experienced. For instance, a student reported three different kinds/categories of autonomy with four different codes in response to the first question (Q1). Another participant reported nothing, marked as NA (not applicable) with no code.

According to the guidelines (Corbin & Strauss, 2008), I read the raw data several times thoroughly. I then started to analyze the data using open coding analysis. According to Corbin and Strauss (2008), open coding is "breaking data apart and delineating concepts to stand for blocks of raw data. At the same time, one is qualifying those concepts in terms of their properties and dimensions." (p. 195) These procedures were done twice more, a few weeks or months later to check if the codes were reliable.

Next, I derived categories through axial coding by relating some relevant concepts from the data and relating each category to its relevant subcategories. This step was required to see what "kinds" of autonomy (or support) students felt and experienced in class mainly through their answers to Q 1 to Q 4. Thus the codes and categories for autonomy were generated through these steps. Finally, three themes emerged from the findings. This process was repeated until theoretical saturation occurred.

Results: Findings of Study 1A

Only 28 surveys were used for the final findings because one survey was not fully completed. Analysis of the data revealed that the participants perceived and experienced "different types of autonomy or its support" from instructors, not confined to a particular way like having choice (obtained from Q1 to Q4, also supported by the interview data from focus group discussion). Interestingly, most of them described "autonomy in their

thinking" rather than other types of autonomy when they were asked to come up with "autonomy" in class in Q1, even though their actual experience of having autonomy in class might occur in a multidimensional way as reported in the description of their actual experiences (from Q2). In fact, participants reported having somewhat less choice in class (from Q3 and the focus group interview data), even though the literature on autonomy support has predominantly highlighted providing students with the opportunity to choose tasks in class. Furthermore, most of them seemed to value more feeling autonomous or having ownership in terms of their own thinking rather than having choice in relation to their learning tasks in class, which implied a possible meaningful relationship between autonomy support in students' thinking and student motivation in relation to putting values on something (obtained from Q5 to Q7).

This report of results for Study 1A involves two parts. In Part I, I present two findings (Finding I & Finding II) and identify the analytic processes and findings regarding the development of the codes and categories of different types of autonomy students could have in class, developed from both written survey question data and focus group interview data. In addition, I report on my attempt to test whether/ how potential items from the American pilot study could be used to measure Korean students' perceptions of different types of autonomy support. In Part II, I present the third finding (Finding III) and discuss how students perceived and experienced different types of autonomy or its support in Korean educational contexts, focusing on what the relationship among them was like.

Part I. Development of Codes and Categories for Different Types of Autonomy in Class in Korean Educational Context

Finding I: Three Different Types of Autonomy in Class. In common, autonomy-supportive teachers tend to listen more, shape students toward openness instead of giving them direct solutions to some problems, and use fewer directives or command (Reeve, 2002). Yet, it seems that some practical questions still remain unresolved: In which educational contexts created by teachers can students feel autonomous emotionally, behaviorally, and cognitively? What kinds of teaching behaviors can facilitate students' feelings of autonomy and educational benefits? Why do students benefit more from being listened to and working independently? What kind of autonomy-supportive teaching behaviors more affect the relationship between being listened to by others in class and students' educational benefits, such as greater conceptual understanding and greater flexibility as well as positive emotions and high competence?

As discussed in Chapter 2, research on autonomy and autonomy-supportive contexts have proposed some effective ways of supporting student autonomy in class, including giving enough time to solve problems independently, listening more, giving students the opportunity to choose something related to learning activities. Among these, one of the most effective ways to support student feelings of autonomy has been considered to provide them with choice. Recently, research has also demonstrated that there might be other kinds of autonomy-supportive ways teachers can utilize effectively in class. For instance, Stefanou et al. (2004) proposed three different kinds of autonomy support but their findings seemed to have some limitations as discussed in Chapter 2.

However, they presented their findings mainly through class observations rather than students' own perceptions or experiences.

Using open coding and axial coding procedures described above, I analyzed the data from 28 participants responding to open-ended question supplemented with the data from the focus group interview. The unit of analysis was each person's individual short answer to each question.

As the first step for the findings, all the Korean words were translated into English by two bilingual individuals I began by typing and coding all the answers to each question in order from person # 1 to # 28 and read them several times with some time intervals, writing out memos, jotting down some details in the right-hand margins, and modifying some parts across two months. A sample note is shown below (see Table 4).

The first question (Q1) asked participants to think about '*autonomy*' in class according to their own perspectives. For example, some of them thought of autonomy in class as the "(a) freedom of thinking." This seemed to be a kind of comprehensive expression including individual/ independent thinking, even based on interactive/ mutual understanding. At the same time, however, it seemed different from other comments such as "(b) having a discussion actively and (c) spending enough time thinking and discussing something with others" in that these two meanings, such as (a) and (b), seemed to indicate somewhat distinct areas of thinking and learning from individual free thinking even though some properties like thinking and learning did overlap.

Table 4. Sample of Sequential Analytic Procedures with Comments and Codes

Phase I	Q 1: From your own perspective, what is the feeling of freedom or autonomy that can be given by an instructor in a lecture room?			
Person No.	Answers	1st Coding	2nd Coding	3rd Coding
# 1	I'm thinking of it as the freedom of thinking. Feeling free when I discuss actively. The freedom of time. I may feel free when I sit on any chairs.	1)- Freedom of thinking 2)- Active discussion 3)- Enough time 4)- Sitting anywhere	1)-> to think freely (cognitive/ thinking/ learning) 2)->to discuss actively (cognitive, thinking) 3)-> to spend enough time (thinking, learning) 4)-> to choose where to sit (behaviors, choice, controlling in environment, not closely related to learning per se)	1)-> to think freely and independently (cognition/thinking-related autonomy: **C1**) 2)-> to discuss actively (**C3**) 3)->to have enough time to think, discuss, and work on tasks (but only three participants: **C8**) 4)-> to choose where to have a seat, when to eat snacks in class, etc. (choosing something not quite related to learning tasks but environment in class: **E1**)

Rather, these three could be subcategories of one certain category in relation to thinking and learning. In this way, the three meanings, as represented in (a), (b), and (c), were coded differently under a category called *Cognitive Autonomy* shown in Table 5 below. Interestingly, however, these three were quite clearly differentiated from a comment like "sitting on any chairs" in terms of autonomy. So, this meaning was coded into a different dimension (coined as *Environmental Choice Autonomy* in my study) from the previous three since it was more associated with choosing something based on students' own volition and control about a certain "environment" rather than "thinking or learning."

Each code in the table 5 was generated through a sequential analysis of participants' answers to open-ended questions mainly from their answers to Q1 to Q4 and partially complemented by the focus group interview data. The coding scheme shown in the table of codes for Autonomy in Class represents the 7th and final version, produced after some feedback from experts. These codes were about the autonomy students might experience or perceive because they were generated and described from students' stances, not from instructors' stances, dealing with their experience of support.

In terms of the coding process, a meaning like "sharing ideas with others" from #2 participant's comment to Q1 in the 4th version was thought to overlap with "communicating with instructor or students" in C2 in the table above. So the tentative code originally called C5 ("to share ideas together") in the 4th version was integrated into C2 in the 5th version.

Table 5. Codes for Autonomy in Class

Coding categories		Codes for Autonomy
Cognitive Autonomy -- Autonomy a person experiences when having an opportunity to think or express ideas freely when learning in class, encompassing from C1 to C8 *from Q1, Q2, Q3, Q4, and focus interview data and mainly from Q4		**C1** To think freely and independently
		C2 To communicate with instructor or students
		C3 To discuss actively
		C4 To express one's own ideas without external control
		C5 To connect various topics or cases and expand thought
		C6 To apply ideas or knowledge to real life
		C7 To present different ideas without a certain answer
		C8 To have enough time to think, discuss, or work on tasks
Behavioral Choice Autonomy— Autonomy experienced when one has choice to control environmental or methodological factors (less closely related to thinking or learning content of class) *from Q1, Q2, Q3, and mainly from Q3	**Task Choice Autonomy --** Autonomy a person experiences when having choice of learning tasks	**TC1** To choose the topics or kinds of assignment
		TC2 To choose evaluation methods or due dates
		TC3 To choose tools for note taking such as laptops, note, cell phones, etc.
		TC4 To choose topics to discuss
	Environmental Choice Autonomy -- Autonomy a person feels when having choice or control of the class environment	**EC1** To choose where to have a seat**,** when to eat snacks in class, etc.
		EC2 To control one's own behaviors without external pressure or oppression such as attending classes, and going out of the classroom during lecture so long as it does not bother others in class

Also, I generated a new code C5 through the data from #9 participant's comment to Q4 for the final version, and labeled it 'to connect various topics or cases and expand thought", which was considered very significant in terms of in-depth learning and thought. In addition, I decided to add C8 in the final version because the issue of "time" had been considered important in the dimension of autonomy in thinking and learning (Reeve, 2002; Stefanou et al., 2004) even if there were only two individual comments mentioning the "time" issue in the survey data from their answers to Q1 and Q4 and from the focus group interview data. For example, # 25 student's response to Q4 was "when I could spend enough time for my resume and other tasks." Another case was from the focus group interview data as follows. The participant's name is a pseudonym. The English version is presented in square brackets below.

연구자: 당신의 경험에 비추어볼 때, 당신은 어떠한 경우에 수업 중 자유롭다고 느꼈나요? 특히 무엇인가를 배울때 말이죠.

Trans.: [Q: *Based on your own experiences, when could you feel free in class? Especially when you were learning something?*]

학생: 글쎄요. 보통 교수님께서 충분한 시간을 주시고 자료를 찾아보라고 하실 때가 있는 데, 이때 일종의 자율성이 느껴졌었어요. 관심있는 주제를 찾고 어떤 통제없이 그냥 글을 쓸 수가 있었어요. 충분히 생각하고 흥미있는 주제나 소재를 찾아 쓰니까 훨씬 더 자율성이 있었죠.

Trans.: [LJH: *Well, I felt autonomous commonly when the professor gave me an opportunity to search for data with enough time. I could try to find some topics of*

my interest and write without any pressure. I felt much better autonomy because I could write after thinking enough and choosing materials of interest.]

Consequently, through these examinations, I decided to include C8 in the final version because the 'time' issue could be counted as a significant factor for Study 1B and Study 2 as well.

Interestingly, some codes in each category seemed somewhat interconnected/ intertwined with one another. For example, C5 (to connect various topics or cases and expand thought) and C6 (to apply ideas or knowledge to real life) seemed to be interconnected since these two could be associated with the expansion of the ability to think deeply. Finally, C2 (to communicate with instructor or students) and C3 (to discuss actively) appeared to be closely intertwined because having a discussion could be one of ways to communicate with others even though the ways of sharing ideas could be different among the students. However, C6 (to apply ideas or knowledge to real life) and TC2 (to choose evaluation methods or due dates) seemed to be relatively quite distant from each other. Through these sequential processes, the different kinds of meanings or interpretations were grouped into separate categories.

Through these processes, finally, three different categories of autonomy that students could feel or experience in class emerged from the data reflecting the theoretical guidance of Stefanou et al.'s (2004): *Cognitive Autonomy, Task Choice Autonomy, and Environmental Choice Autonomy* (see Table 5). In Study 1A, ***cognitive autonomy*** was defined as "autonomy a person experiences when having an opportunity to think or

express ideas freely in class," generated from students' answers to Q1, Q2, Q3, Q4, mainly from Q4, and focus interview data. Second, ***task choice autonomy*** was defined as "autonomy a person experiences when having choice of learning tasks." Third, ***environmental choice autonomy*** referred to mean "autonomy a person feels when having choice or control of the class environment." The second and third categories were generated from Q1, Q2, Q3, and mainly from Q3. The last two categories were considered to be integrated into one encompassing larger category named *Behavioral Choice Autonomy* in that the two were relatively less related to thinking and learning class content, and also it seemed that they overlapped in many ways. For my study, I decided to spotlight only ***Cognitive Autonomy*** and ***Task Choice Autonomy*** in that these two were more likely to be associated with learning or learning tasks in class, more appropriate for the purposes of my main study.

In addition, the overall consistency of basic concepts between *the three different kinds of autonomy in Study 1A* and *three distinct features of autonomy support* that Stefanou et al. (2004) suggested were identified by comparing the concepts and features with each other (Table 6).

Each corresponding construct from the two data sources seemed to be quite similar. For example, the characteristics of Cognitive Autonomy from Study 1A overlapped with Cognitive Autonomy from Stefanou et al.'s research in that they both indicated the autonomy or ownership of learning and thinking independently.

Table 6. Comparison of Stefanou et al.'s (2004) Three Different Features of Autonomy Support in Class with Three Different Categories Emerging from the Data in Study 1A

Stefanou et al.'s (2004) three distinct features of autonomy support	Three different categories of autonomy from Study 1A
Organizational autonomy Students' ownership of an environment; students can make choices over environmental procedures, such as developing classroom rules together, choosing the due dates of assignments, and choosing project group members.	***Environmental choice autonomy*** Autonomy a person feels when having choice or control of the class environment. e.g.) to control one's own behaviors without external pressure or oppression such as attending classes, and going out of the classroom during lecture so long as it does not bother others in class
Procedural autonomy Students' ownership of form enables students to control the selection of media to present their ideas, such as making a graph or picture to illustrate a science concept.	***Task choice autonomy*** Autonomy a person experiences when having choice of learning tasks. e.g.) to choose evaluation methods or due dates
Cognitive autonomy Students' ownership of learning and allows them to have their own ways to justify and argue for their points, generating their own questions and solutions.	***Cognitive autonomy*** Autonomy a person experiences when having an opportunity to think or express ideas freely in class

The only remarkable difference between the two sources was that Stefanou et al.'s Organizational Autonomy appeared to share some components of Task Choice Autonomy as well as Environmental Choice Autonomy in Study 1A. For example, choosing evaluation methods or due dates for assignments was categorized into Task

Choice Autonomy in Study 1A because it was interpreted to be relevant to learning or learning tasks in this study rather than environmental factors whereas a similar concept was sorted into the Organizational Autonomy in Stefanou et al.'s (2004) study. Except for this aspect, it seemed that Stefanou et al.'s three different features of autonomy (support) seemed to be perceived and experienced by students in Korean.

Further examination will be discussed in the following section when I report on a check to see if the original version of PCAS and PC scales developed based on Stefanou et al.'s (2004) work and my pilot study with five interviewees in America, could be used for my study in Korean contexts.

Finding II: An Examination of the Consistency of the Codes of Different Types of Autonomy from Korean Students with the Pilot Study Completed in America. As the second step for the findings in Study 1A, I attempted to match what I found in Korean settings with what I had developed with my colleagues in America. The codes for autonomy from Study 1A were paralleled and compared with each subcategory from the PCAS and PC scales, that is, the five subcategories of the PCAS and the one subcategory of PC, which my colleagues including an expert in the qualitative study area and I had developed through exploratory/confirmative factor analysis in the pilot study, considering content validity.

This process was necessary because any mismatched or distinct concepts should be reported and considered in scale development in presumably different contexts. That is, different points should be considered for possible modification, removal, or inclusion for Study 1B, and perhaps Study 2.

Table .7 Relationship between the Subcategories in PCAS and PC and the Cognitive Autonomy and Task Choice Autonomy Codes Developed from Study 1A

Subcategories of PCAS and PC scales in Pilot Study	**30 PCAS (no.1 ~ 30) and 7 PC (no. 31~37) items**	**Codes for Autonomy in Study 1A**
PCAS Sub1: Enough Time to Think (1~5) ←C8	[ENOUGH TIME TO THINK] PCAS1. My instructor gives me enough time to think about what we learn in the classroom. PCAS2. I am allowed to spend time discussing some issues in class. PCAS3. I have enough time to exchange ideas with others. PCAS4. I have ample time for decision making in this class. PCAS5. I have enough time to solve some questions by myself.	**C8** To have enough time to think, discuss, or work on tasks
PCAS Sub2: Thinking Differently, Exploring Multiple Solutions (6~11) ←C7	[MULTIPLE SOLUTIONS/COGNITIVE FLEXIBILITY] PCAS6. My instructor encourages me to present different approaches to the same issue or problem. PCAS7. My instructor allows me to employ various sources in order to consider an issue or solve a problem. PCAS8. My instructor asks me to discuss multiple approaches. PCAS9. I am allowed to use different methods to solve a problem. PCAS10. My instructor gives me freedom to think in different ways. PCAS11. My instructor welcomes different opinions._	**C7** To present different ideas without a certain answer
PCAS Sub3: Self-directed Learning/ Self-reliant Learning (12~18) ←C1, C4	[SELF-DIRECTED LEARNING/SELF-RELIANT LEARNING] PCAS12. I feel that I am an independent thinker or problem solver through classroom activities. PCAS13. I experience many chances to justify or argue for my points. PCAS14. My instructor encourages me to generate my own thinking. PCAS15. I feel that I am the owner of my learning in this class. PCAS16. I believe that I can make a decision about a class issue according to my own criteria. PCAS17. My instructor encourages me to think about some information, rather than just telling us. PCAS18. My instructor asks me to evaluate my own or other students' ideas.	**C1** To think freely and independently **C4** To express one's own ideas without any external control

Table 7 continued

PCAS Sub4: Critical Thinking/ Convergent Thinking (19~24) ←C5, C6	[CRITICAL THINKING/ CONVERGENT THINKING] PCAS19. My instructor helps me think about some issues in a critical way. PCAS20. I am encouraged to compare or contrast different ideas by my teacher. PCAS21. My teacher encourages me to relate the material presented in my class to my background knowledge. PCAS22. My instructor pushes me to come up with some alternative ways to interpret something. PCAS23. My teacher encourages me to think how to apply the knowledge I've just learned. PCAS24. My instructor makes me generate questions about the ideas and issues we are learning.	**C5** To connect various topics or cases and expand thought **C6** To apply ideas or knowledge to real life
PCAS Sub5: Active Communication or Discussion (25~30) ←C2, C3	[ACTIVE COMMUNICATION OR DISCUSSION] PCAS25. I think that my instructor is open to debate. PCAS26. I feel that my ideas are respected by my instructor and other classmates in this class. PCAS27. I am encouraged to share ideas or expertise with others. PCAS28. My instructor does not make me feel dumb. PCAS29. I think my instructor listens carefully to what I am saying. PCAS30. My instructor makes me feel like I am saying something meaningful.	**C2** To communicate with instructor or students **C3** To discuss actively
PC Having Choice (PC 1~7) ←TC1 ~ TC4	[CHOICE] GENERATED BASED ON STEFANOU ET AL. (2004) AND 5 INTERVIEWS PC1. My instructor gives me chances to choose an assignment topic. PC2. My instructor allows me to choose materials to use in class projects. PC3. I think I have freedom in how to handle materials to study. PC4. My instructor provides me with an opportunity to choose evaluation procedures. PC5. I think I have some say in deciding due dates for assignments. PC6. My instructor allows me to choose my group members. PC7. My instructor gives me a chance to select the topic of the presentation or paper.	**TC1** To choose the topics or kinds of assignment **TC2** To choose evaluation methods or due dates **TC3** To choose tools for note taking such as laptops, note, cell phones, etc. **TC4** To choose topics to discuss

In Table 7 above, the relationships among the subcategories in the 37 items from both PCAS and PC scales and the 12 codes from Study 1A are presented and compared. First, I examined whether or not the four TC (Task Choice Autonomy) codes were well matched with the corresponding subcategory and the items on the PC scale. It seemed that they shared a common property, referring to choice in class in relation to learning tasks in general. Then, each subcategory of the PCAS and PC scales was compared with each code for autonomy in class produced from the data in Study 1A. For example, **C8** (to have enough time to think, discuss, or work on tasks) seemed to match with the first subcategory of the PCAS scale, that is, having enough time to think. Interestingly, each item under the subcategory also seemed to elucidate C8 most clearly.

Most of all, both C2 (to communicate with instructor or students) and C3 (to discuss actively) were frequently mentioned. That is, students seemed to say they felt more autonomous as having autonomy in class in situations when they were allowed or encouraged to communicate with their instructor or other students freely or to discuss actively in a small group. In the written survey, participants reported C2 and C3 quite often when they were asked to answer Q1 and Q2. For instance, C2 and C3 were mentioned six (25%) and four times (16%) respectively out of 24 in total in frequency in responding to Q1. Also, they were mentioned six (19%) and seven times (23%) respectively out of 31 in frequency in relation to cognitive autonomy actually experienced in class in response to Q2. Furthermore, I found the items from the 5th subcategory of the PCAS to match C2 and C3 quite well in that, for instance, active

communication with the instructor or students and open discussion may happen in situations where "instructors are open to debate and share ideas with students in class."

However, both C2 (to communicate with instructor or students) and C3 (to discuss actively) did not seem to be consistent with two items from the fifth subcategory in the PCAS, no. 26 (I feel that my ideas are respected by my instructor and other classmates in this class) and no. 30 (My instructor makes me feel like I am saying something meaningful) in the table above. Originally, there two items were added to measure students' feelings of respect from the instructors or other students in class in the pilot study. Only one participant, participant # 22, reported the importance of respect by instructors in class when she answered the first question on the written survey (in Q1): "내 생각에는, … 나는 자유라는 느낌이나 강의실에서의 자율성이라는 것은 자신의 생각을 분명히 표현하고, 존중받을 수 있는 것이라고 생각한다. [Tran.: *In my opinion, … I think the feeling of freedom or autonomy in a lecture room is to express our own ideas exactly and to be respected*.]" She was the only student mentioning the component of feeling respected by others in autonomy-supportive environment. As she was from the second comparison group (from University B), I could not examine what she meant further because I could not contact participants in this group after the first phase of the study. Instead, in the second phase of Study 1A, the focus group interview, I met with 10 people from University A and asked their ideas about the feeling of being respected in relation to autonomy so as to elaborate its property in detail. Concerning this, only one participant responded as follows:

연구자: 지난 설문조사에서 여러분들께서 응답하신 것을 보면, 많은 참가자 여러분들께서 토론할 때 혹은 발언할 때 갖게 되는 여러가지 느낌에 대해서 말씀해주셨는데요. 여기 계신 여러분은 어떠한 느낌이나 경험들을 가지셨나요?

Trans.: [*Researcher: Looking through your answers to the written survey questions, I think many of you described various kinds of feelings you had when you discussed something or expressed your ideas. Could you tell me what kind of experiences or feelings did you have about this?*]

학생: 발언할 때, 교수님으로부터의 존중감을 느껴요. 피드백도 받고, 보충설명도 해주시고, 정리도 해주시고. 토론중에 교수님이 존중해주신다는 느낌을 많이 받는데, 자유발언을 할 수 있는 기회가 있다는 것에...

Trans.: [KYJ: *When I say something, I feel respected by professors. (I've) got feedback. (He or she) elaborates and summarizes something. During discussion, (I) feel like professors respect me quite a lot, because I'm given an opportunity to talk freely...*]

Considering this response, it seemed that the student had a chance to feel respected in a situation where she was able to express her own ideas. In sum, the student might have *felt respected* by an instructor when she could *voice her own opinion* in class where the instructor *was supportive of student autonomy*. This process could be interpreted as a reciprocal process. In a sense, feeling respected could be considered as the secondary product generated in autonomy supportive contexts where instructors gave students the chance to talk often. For these reasons, finally, the two items, no. 26 and no.

30 about feeling respected, were not included into the potential PCAS-K scale for the following study, Study 1B, in measuring students' perceptions of cognitive autonomy support in class.

Part II. Understanding Autonomy or its Support in Korean Educational Settings

Finding III: Students' Own Experiences and Perceptions of Autonomy in Class. After creating the coding schemes for autonomy in class, I revisited the transcripts and created four frequency tables based on students' answers to each question from Q1 to Q4 in the written survey questions, as the third step in analyzing and reporting the findings of Study 1A. Analyzing some patterns and features from the four tables along with the data from the focus group interview, I attempted to delve into autonomy in class to examine what actually happened to students' experience of autonomy in the Korean educational context.

Before exploring how students perceived and experienced various kinds of autonomy in class and the autonomy support from instructors in Korean educational settings, I attempted to look into what had happened between students' perceptions or ideas and their own experiences for the following reasons.

As previously discussed, my study targeted measures of students' *perceptions* of different types of autonomy in class for the main study. *Perceptions* in this study did not mean simply a certain process of using the senses to acquire information in a situation. Rather, it was considered as the process or the result of the processes of perception, obtained from the organization or *interpretation* of some phenomenon or sensory information (Schacter, 2011). It meant *a way of understanding or thinking* about some

information. Also, individuals' perceptions may be dissimilar from the others' perceptions or from "objective" reality, experiences, or phenomena in a context because it would be shaped by different values, desires, expectations, learning, desirability, or actual experiences in a situation. Thus, so as to measure students' perceptions of autonomy in class in the main study, I decided to explore any possible gap in terms of their own report about their perceptions or thoughts and actual experiences in class, in spite of some potential limitations. This was performed based on the following assumption: the higher the discrepancy level between their report about their perceptions and individual experiences was, the less reliable the research findings would be because I also assumed that responses to a self report measure might be contaminated because there could be a kind of social desirability or consideration about social norms or value. Therefore, I presented two questions in particular to catch any different patterns of their answers to each question, Q1 and Q2.

Q 1: From your own perspective, what is the feeling of freedom or autonomy that can be given by an instructor in a lecture room?

Q 2: What kinds of autonomy or freedom have you actually experienced in class?

Q1 was asking about students' own perspectives or ideas that might have been formed individually and also socially for many years whereas Q2 was requesting their responses to their own actual experiences in class, keeping a course they had taken in mind. For the frequency tables, I marked 'v' whenever I found concepts or meanings

representing the Autonomy in Class codes presented in Table 5 in Part I. There were some cases where one student's answer to Q1 had several codes. On average, each person had 1.43 codes per question in Q1 and Q2. For Q3 and Q4, individuals presented 1.11 and 1.36 codes per item respectively. In cases that a certain answer to each question was ambiguous, it was marked NA (not applicable) in each table.

Table 8. Study 1A: Open-ended Written Question (Answers to Q1)
Q1: From your own perspective, what is the feeling of freedom or autonomy that can be given by an instructor in a lecture room?

	C								TC				EC		Freq.
Person No.	C 1	C2	C 3	C 4	C 5	C 6	C 7	C 8	TC 1	TC 2	TC 3	TC 4	E1	E2	
1	v		v					v					v		4
2		v	v	v											3
3				v											1
4			v												1
5						v									1
6							V								1
7		v		v			V								3
8		v											v		2
9		v		v											2
10 NA															0
11											v			v	2
12														v	1
13											v			v	2
14				v											1
15 NA															0
16														v	1
17														v	1
18														v	1
19 NA															0
20			v	v			V								3
21 NA															0
22				v											1
23													v	v	2
24		v													1
25									v	v					2
26														v	1
27													v	v	2
28		v													1
Freq.	1	6	4	7	0	1	3	1	1	1	2	0	4	9	
Total	24								4				13		

First, comparing the patterns shown in the two different frequency tables for Q1 and Q2 in Table 8 and Table 9, I identified that the distribution of codes in responses

Table 9. Study 1A: Open-ended Written Question (Answers to Q2)
Q 2: What kinds of autonomy or freedom did you actually experience in class?

	C								TC				EC		Freq.
Person No.	C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8	TC 1	TC 2	TC 3	TC 4	E1	E2	
1 NA															0
2		v													1
3		v		v											2
4					v										1
5	v														1
6				v			V							v	3
7		v	v	v											3
8		v			v										2
9		v				v									2
10			v												1
11				v											1
12			v									v			2
13			v	v											2
14				v											1
15 NA															0
16														v	1
17 NA															0
18			v	v											2
19			v									v			2
20				v			V							v	3
21			v	v											2
22		v		v											2
23 NA															0
24				v											1
25									V	v					2
26														v	1
27									V						1
28	v														1
Freq.	2	6	7	11	2	1	2	0	2	1	0	2	0	4	
Total	31								5				4		

from 28 participants to Q1 did not perfectly correspond with the codes from Q2, as shown in Table 8 and 9.

However, patterns from each table in general looked similar. In order to check if each participant reported the same code per question responding to Q1 and Q2 questions, I paralleled the two frequency tables, matching each person's answers and highlighting each code using different colors in Q2 frequency table. For example, in case of consistency between the two tables per person, the code was highlighted in red in Table 9from Q2 whereas a newly mentioned meaning with a new code was highlighted in green in Table 9. As a result, I identified that there was about 38 % consistency between the two frequency tables. For example, person # 25's comment showed one TC1 code (to choose the topics or kinds of assignment) and one TC2 code (to choose evaluation methods or due dates) in Q1 table, and her responses were coded with the same codes in Q2 table. This was considered to be a kind of test of consistency between students' perceptions or ideas and their actual experiences in class based on their report.

In addition, the percentages of codes coming from the three distinct categories were 58% for C (cognitive; from C1 to C8), 10% for TC (task choice; from C1 to C4), and 32% for EC (environmental choice; from EC1 and EC2) in the Q1 frequency table whereas the percentages in the Q2 frequency table were 78% for C, 12% for TC, and 10% for EC. In particular, looking at the frequency of EC codes in the two tables, the number of EC codes in response to Q1 was considerable (n=13 in total), compared to the number of EC codes in response to Q2 (n=4 in total) (see Tables 8 and 9). Remarkably different numbers of EC codes between the two tables might imply that students' perceptions of autonomy could be different from what they really experience in class, and furthermore that students experienced less Environmental Choice Autonomy, especially

EC2 in the real world even though they regard autonomy in class as being able to control their own behaviors or their environment by their own volition. More interestingly, EC2 (to control one's own behaviors without external pressure or oppression such as attending classes, and going out of the classroom during lecture so long as it does not bother others in class) was reported quite often by participants from the second group (from University B) who had relatively lower entrance exam scores. This phenomenon might imply something meaningful with respect to the relationship between the different impact of different types of autonomy support and student achievement level for future research. For these reasons, the phenomenon related to EC2 in this study was not examined any further, as the result implied inconsistency and also, this was not my interest for this study.

On the basis of these comparisons focusing on the frequencies of each code and the patterns shown in the two frequency tables, I found that (a) participants might perceive and experience three different types of autonomy, as reported in Part I above, (b) their perceptions or experiences of autonomy in class might have a tendency to converge toward the construct of Cognitive Autonomy in class, which emerged most frequently in both tables; specifically, C4 (to express one's own ideas without external control) were reported quite often when participants thought of autonomy in class (11 out of 31 Cognitive Autonomy related codes in Q1 table), (c) in relation to the second finding, participants seemed to have rarely experienced having choice in class, which was a meaningful finding lending an impetus to the following study, Study 1B, and (d) it seemed that the pattern of students' perceptions of autonomy in class matched to an

acceptable degree with the distribution pattern of students' report about their own experiences of autonomy, as discussed above.

Finding IV: An Exploration of Participants' Perceptions of Different Types of Autonomy in Class

Next, I looked into the other two frequency tables generated from answers to Q3 and Q4 in order to elucidate how clearly students perceived and cognitively differentiated different types of autonomy in class. It has been reported that Korean students are more likely to experience teaching by rote in a controlling context rather than autonomy-supportive environment. In this aspect, it was assumed that it would be helpful for my main study to check whether or not participants perceived or differentiated different types of autonomy because of lack of experiences of choosing something or having autonomy support in Korean educational settings.

Based on the two survey questions Q3 and Q4, I analyzed each participant's responses to each question by coding them with the Autonomy in Class codes I had developed (see Appendix I and J).

Q 3: In which case did you feel free or autonomous in terms of your behaviors?

Q 4: In which case did you feel free or autonomous in terms of your thinking or cognition?

First, looking into Q4 and its frequency table, Q4 was requesting students' feelings of freedom or autonomy in class focusing on their own learning and thinking.

This question was devised for the purpose of identifying whether or not students could think of autonomy in their thinking when learning, unlike other types of autonomy in class. Responding to Q4, all the participants except for one student, person # 11, came up with something related to the Cognitive Autonomy codes. For example, a student (No. 22) reported both C4 (to express one's own ideas without external control) and C7 (to present different ideas without a certain answer) as an answer to Q4: *I feel autonomous when a professor accepts both different answers and my ideas about his specific questions or topics*. This comment was analyzed to have two distinct codes implying experiences of cognitive autonomy or its support provided by professors.

In contrast, concerning Q3 asking about feelings of autonomy in terms of behaviors, there were 19 EC2s and three EC1s (EC: Environmental Choice Autonomy) codes. Also, there were seven C codes (C: cognitive autonomy) and two TC (TC: Task Choice Autonomy) codes were included. Concerning the question asking about their feeling of freedom or autonomy in terms of their behaviors in class, most of their responses were weighted toward EC2 codes (to control one's own behaviors without external pressure or oppression such as attending classes, and going out of the classroom during lecture so long as it does not bother others in class) rather than Task Choice Autonomy. This result might result from either a lack of experience about choosing something in class or a mistaken interpretation of the term *the autonomy in behaviors*. Moreover, the distribution of codes in both Cognitive Autonomy and Task Choice Autonomy categories seemed to imply the necessity of conducting another study to examine whether or not students can tell the different types of autonomy apart clearly.

Summary

In Chapter 3, I reported that participants in Korean educational settings perceived and experienced three different types of autonomy in class, shown in Table 5: Cognitive Autonomy, Task Choice Autonomy, and Environmental Choice Autonomy. Second, I also found that *cognitive Autonomy* was defined as autonomy a person experiences when having an opportunity to think or express ideas freely in class. Also, *task choice autonomy* was defined as autonomy a person experiences when having choice of learning tasks. Third, through the comparison of data from Study 1A with PCAS and PC scales and their subscales together, I concluded that the items of PCAS (excluding item no. 26 and no. 30) and the items of the PC scales could be used in Study 1B and even possibly for Study 2, the main study in a Korean educational context. The two items above about feeling respected by instructors and other students in class were deleted because of their incompatibility with other items.

Focusing on the first two types of autonomy of my interest, Cognitive Autonomy and Task Choice Autonomy, I decided to identify if a larger group of people would report different kinds of autonomy in class using a large sample size and administering the self-report scales in a standard manner. This is the focus of the next chapter.

Chapter 4

Study 1B

Purpose

The purpose of Study 1B was to develop and confirm scales to measure perceptions of cognitive autonomy support in a Korean context, PCAS-K (developed with Korean undergraduates; K indicating Korean version) and perceived choice, PC-K, for use in Study 2. That is, Study 1B involved the development of PCAS-K and PC-K scales through the use of factor analysis to provide evidence of construct validity. It also examined their relationships with other extant established scales measuring various types of autonomy support for the purpose of convergent validity of both PCAS-K and PC-K scales, to determine whether PCAS-K and PC-K were measuring the constructs as they had been defined.

For Study 1B, I began with a pool of 28 potential PCAS-K and 7 PC-K items, somewhat reduced through Study 1A, and administered them to a larger group of students in order to select the final items for both scales. Exploratory factor analysis (EFA) was conducted in order to examine empirically the underlying factor structure of the two new scales, prior to SEM as a confirmatory procedure. It was expected that 1) the items of the potential PCAS-K and PC-K would load on distinctive factors, 2) the final PCAS-K scale would have five subscales, and 3) that the PCAS-K scale would have positive and somewhat high correlations with other corresponding extant autonomy support scales.

Through EFA (exploratory factor analysis), the number of dimensions was verified and items were deleted or retained according to each item's factor loadings,

cross-loadings on the factors, and reliabilities (Neff, 2003; Worthington & Whittaker, 2006). Then, confirmatory factor analysis (CFA) was used to assess the goodness of fit of the model to the data.

Method

Participants and Procedures

Participants for Study 1B were 113 undergraduates who were recruited from a large university in Seoul, Korea (47 females (42%); 66 males (58%); mean age= 20.57 years; SD=1.05). Of the 113 participants, 20% indicated they werefreshmen, 26% sophomores, 31% juniors, and 23% seniors. Their majors varied. The distribution of majors was 33% Liberral arts (n=38), 26% Social Science (n=29), 19% Natural science (n=21), 15% Engineering (n=17), and 7% others including Education and Communication (n=8). This sampling was based on a combination of convenience and purposeful sampling. Independent samples t-test showed no significant differences in terms of sex on the potential PCAS-K and PC-K scales.

With the help of one of the instructors, I contacted six instructors teaching a school-wide writing course accommodating about 20 students in each course. I emailed them, informing them of the purpose of the study in brief without mentioning the main constructs of autonomy or autonomy support. Upon their consent, I distributed a set of written surveys to their students.

Participants were asked to sign the consent form in case they agreed to participate and to report their gender, classification, major, type of class, and so forth (Appendix C and D). They were also guided to choose and name one of the courses they had taken

recently or were taking currently as the focus of their response to respond to the questionnaire.

Some systematic variance generated by the sample characteristics led me to be concerned that the participants in Study 1B were from a particular group of undergraduates sharing specific characteristics (age, education, educational achievement levels, etc.). However, when I examined their responses to the demographic questions, I saw that the sample was adequate because the participants were from different academic areas and because they reported to be thinking of different courses as they responded.

As for sample size, I followed Worthington and Whittaker's (2006) guidelines. They recommended researchers check if all communalities are .60 or greater in case of small sample sizes between 100 and 150. Also, they recommended to keep at least 4:1 items per factor and to have factor loadings greater than the absolute value of .60. The data fit these requirements in spite of small samle size.

Measures

Four scales were tested in Study 1B: the refined versions of the PCAS-K (28 items) and the PC-K (7 items) from Study 1A, called *potential PCAS-K* and *PC-K* scales, and two extant scales, including perceived cognitive autonomy support (Tsai et al., 2008) and perceived choice scale (Assor, Kaplan, & Roth, 2002) to be used to help me refine the two final new instruments for the main study, Study 2. All items were rated on a 7-point scale (1-not at all true of me, 7-very true of me).

The items measuring the five components of the potential PCAS-K and the one component of potential PC-K were analyzed using exploratory factor analysis (EFA), I

then ran confirmatory factor analysis (CFA) with a different sample of respondents (participants in Study 2). The final versions of the items from the two scales were selected based on the criteria of high reliability, factor loadings that are over an absolute value of 0.40, no cross-loadings on the factors, and also theoretical reasons (Jones-Wiley, 2007; Neff, 2003). Then, the final versions were analyzed through CFA to check the goodness of fit of the model to the data. Using CFA, a second model having higher-order perceived cognitive autonomy support was tested as well. All measures were translated into Korean through the procedure of back translation undertaken by two fluent bilingual translators.

Potential Perceived Cognitive Autonomy Support-K (PCAS-K). Participants were administered the set of 28 items of PCAS-K, refined from Study 1A. In Study 1A, the original PCAS 30 items were explored with Korean participants. Some items were modified when required. As a result, two items, no. 26 and no. 30, were removed. Keeping 28 items to measure one construct seemed to be adequate as DeVellis (2012) recommended having several items, three or four times as large as the final scale, for the purpose of strong internal consistency reliability represented by how strongly the items correlate with one another, the latent variables.

I began from the assumption that there would be five subscale factors in the PCAS-K scale: 1) enough time to think, 2) thinking differently, exploring multiple solutions, 3) self-directed/ self-reliant learning, 4) support for critical/ convergent thinking, and 5) active communication or discussion. Each subscale had five or six items. I expected that five subscale factors would emerge in the PCAS-K, and that the PCAS-K

scale would be differentiated from the potential PC-K scale. The Cronbach coefficient of the 28 items before EFA was .97.

Potential Perceived Choice-K (PC-K). The 7-item scale measuring students' perceptions of having choice in class was also administered. As described earlier, the construct of "perceived choice" was meant to tap into students' having choice in relation to learning tasks in class, not to having choice of their class environment. The sample questions included "my instructor gives me a chance to choose an assignment topic" and "I feel I have some say in deciding due dates for assignments." The Cronbach coefficient was .87.

Perceived Choice (by Assor et al., 2002). The measure of students' perceptions of choice used by Assor et al. (2002) was selected to see how it correlated with the newly generated PCAS-K and PC-C as evidence of convergent validity. This 7-item measure was included because it was considered as assessing the degree to which students perceive the teacher as providing choice in terms of selecting classroom activities as well as the degree to which they experience different types of autonomy support from the teacher.

I expected that this scale would be moderately associated with both new scales of the potential PCAS-K and PC-K because Assor et al.'s (2002) scale contained many items that seemed to tap into students' perceptions of both cognitive autonomy support and the provision of choice by teachers. The questions included "when I am doing something that is interesting to me, the instructor gives me enough time to finish it," "the instructor allows me to choose how to do my work in the classroom," "the instructor asks

us if there are things we would like to change in the way we study," and "the instructor encourages me to work in my own way." The Cronbach alpha was reported at .75 in Assor et al.'s (2002) study. The Cronbach coefficient from my data was .92.

Perceived Cognitive Autonomy Support (by Tsai et al., 2008). Participants were asked to respond to the Perceived Cognitive Autonomy Support scale that was used in Tsai et al.'s (2008) study. This scale measures whether students perceive instruction as involving them cognitively: "We worked through exercises that helped us understand the topic," "Different students presented their solutions to the same task," "Our instructor set tasks that required time to reflect," and "Our instructor emphasized the relations between the topics discussed" (Tsai et al., 2008, p. 464). Along with the correlation between a new version of PCAS-K and this scale, the scale's reliability and factor loadings were compared with the newly developed PCAS-K scale to see whether they were moderately associated to ensure that the new PCAS-K was measuring a similar construct but showing higher reliabilities and better factor solution. The Cronbach coefficient was .76 in Tsai et al.'s (2008) study, and it was the same, .76 from the current study.

Data Analysis

EFA and CFA. First, EFA (exploratory factor analysis) using SPSS 18.0 was conducted to assess the underlying factor structure and select the final scale items for both PCAS-K and PC-K. Also, the convergent validities of the PCAS-K and PC-K scales were examined, adding other extant scales tapping into similar constructs to check convergent validity. Not only each item's reliability but also each subscale's from each instrument was examined. The final PCAS-K and PC-K items extracted from EFA were

tested with the responses from Study 2 using CFA (confirmatory factor analysis) to confirm the factor solution from EFA with a new sample of respondents. Amos 18.0 version was used for CFA.

Factorability. Factorability of the correlation matrix was examined. The factorability was examined through both the Kaiser-Meyer-Olkin (KMO) for sampling adequacy and Bartlett's test of sphericity. According to Tabachnick and Fidell (2001), values of .60 and higher are preferred for a good factor analysis. In Study 1B, the KMO was .93, and Bartlett's test value for potential PCAS-K was statistically significant ($p<.001$). In terms of the potential PC-K, the KMO was .79, lower but still above criterion, and Bartlet's test proved statistically significant ($p<0.001$).

Extraction methods. In terms of extraction methods, one of the common factor analysis methods was employed for this phase of scale development. In general, two distinct methods have been consistently discussed as fulfilling different purposes: principal component analysis (PCA) and common factor analysis (CFA). PCA is used to reduce the number of items in maintaining "as much of the original item variance as possible" whereas CFA is used to uncover "the latent factors or construct that account for the shared variance among items" (Worthington & Whittaker, 2006, p. 818). For my study, using CFA methods seemed more consistent with the purpose of developing new scales. Among various CFA methods including principal-axis factoring, maximum likelihood, image factoring, and alpha factoring, I selected maximum likelihood (ML) estimation because maximum likelihood extraction has often been considered to have "some advantages over other FA procedures as a confirmatory technique" (Worthington

& Whittaker, 2006, p.819). Maximum Likelihood (ML) extraction provides some information for computation of model fit indices and correlations among factors while requiring the assumption of multivariate normality by checking skewness and kurtosis.

Rotation method. In factor analysis (FA), there are two basic types of rotation methods: orthogonal and oblique. Orthogonal rotation methods are used when the factors underlying a scale are known to be uncorrelated. Oblique rotations are used in cases where the factors are assumed to be correlated. In case of moderate to high correlations among factors, oblique rotation methods should be used. Based on existing autonomy support related theory and data, I chose Promax, one of the oblique rotation methods because it was assumed that the subscales would likely be correlated.

Criteria for factor retention. Several criteria were applied to factor retention. First, eigenvalues were estimated to determine the importance of each factor, also providing me with information about the total amount of variance in the items explained by a given factor. According to Kaiser (1958), eigenvalues less than 1.0 refer to unstable factors. At the same time, the scree plots were also examined. Second, the number of factors were designated from 1 to 7, when trying to extract a meaningful number of factors and checking and comparing the Goodness-of-fit of each factor solution designated from 1 to 7. That is, for the purpose of checking the goodness of the fit, RMSEA was calculated in Excel program using the sample size, degrees of freedom, and chi-square values. As a result, a 5-factor solution was selected because of the goodness of fit. Each factor had at least 3 items. Even though the features of the 5-factor solution were

somewhat different from the five subscales I had expected, each factor was conceptually interpretable and meaningful.

Criteria for item retention. For the purpose of having reliable factors in each scale, I tried to retain as many items as possible, considering meaningful conceptual interpretability of interest. At the same time, however, five strict criteria were applied: (a) retaining items with a factor loading of .40 or above, (b) deleting items showing cross-loadings less than .15 difference from an item's highest factor loading, (c) retaining items with high reliabilities over .80, (d) considering deleting items with low communalities after rotation of less than .40 because it is possible that these items might be less correlated with one or more factors, and (e) retaining factors having a minimum of three items.

Results: Findings of Sutdy IB

PCAS-K and PC-K. For the purpose of the new scale confirmation for PCAS-K and PC-K, three analyses were conducted: EFA, CFA, and reliabilities. First, before conducting EFA, I examined the distribution of every item for normality by checking both skewness and kurtosis. Every item satisfied the criteria for the two (skewness <2, kurtosis <4).

EFA. ML (maximum likelihood) was repetitively conducted for the data for the potential PCAS-K with Promax rotation by designating the different number of factors from 1 to 7, one after another in order to check the number of factors explaining the items, using 28 potential PCAS-K items (Table 10).

Table 10. Model Fit indices for PCAS-K scale before the final Item Deletion

Models	χ^2	df	p	RMSEA
1 factor	869.473	350	.000	.115
2 factor	689.953	323	.000	.101
3 factor	587.552	297	.000	.093
4 factor	499.057	272	.000	.086
5 factor	424.917	248	.000	.080
6 factor	362.903	225	.000	.074
7 factor	300.151	203	.000	.065

As shown in Table 10 above, a 1-factor model was not shown to explain the data well because it showed a poor model fit. The more the number of factors of each model increased, the better model fit each had. However, there were no meaningful changes or intervals in terms of each RMSEA difference from 4-factor model to 6-factor model. Finally, based on the indices of goodness (RMSEA), theoretical definition, and conceptual interpretability, the 5-factor solution was selected to explain the data because 5 individual concepts or latent variables retained through Study 1A were considered important in this study (Worthington & Whittaker, 2006). That is, through the pilot study, my colleagues and I had assumed that PCAS-K would have five subscales after analyzing some previous research and interviewing some students. In extracting the meaningful number of factors and checking the goodness-of-fit of each factor solution designated from 1 to 7, a 5-factor solution was selected because of RMSEA index.

With the 5-factor model, five criteria guided the factor and item retention: (a) retaining items with a factor loading of .40 or above, (b) deleting items showing cross-loadings with less than a .15 difference from an item's highest factor loading (Zwick & Velicer, 1986), (c) retaining items with high reliabilities over .80, (d) considering deleting items with low communalities of less than .40, and (e) retaining factors having a minimum of three items.

In terms of total variance explained, the cumulative percentage of extraction sums of squared loadings in the 5-factor solution was 68.14%. Regarding its factor correlations, the correlation coefficient values ranged from .30 to .79, representing moderate and somewhat high correlations.

In Study 1B, after using EFA (exploratory factor analysis), I saw the need to redefine and reorganize, the previously defined concepts of each subcategory according to new groupings because some items loaded on different factors than I had predicted from Study 1A. Thus, the titles of the five categories were renamed according to the specific properties and their interpretability (see Table 12).

For example, PCAS8-K ("My instructor asks me to discuss multiple approaches") was originally assumed and designed to belong to the second subscale, named *Thinking Differently, Exploring Multiple Solutions* in Study 1A. Yet, as a result of the EFA in Study 1B, PCAS8-K proved to load on a newly generated category, called *Having a Discussion among Students* with other relevant items such as PCAS2-K and PCAS27-K. In a sense, it was considered more reasonable to move PCAS8-K to the new category in

that the core concept of the item seemed to be more closely related to situations where discussion among students is allowed.

Likewise, items from PC1-K to PC7-K, belonging to the 7-item potential PC-K in the survey, were examined. Initially, instead of ML (maximum likelihood), EFA was conducted with PCA (principal component analysis) and Varimax rotation method, which have been commonly used in EFA. In other words, the PC-K scale had not been fully developed in this study. The seven items were mainly adapted from extant scales measuring perceived choice and modified for my study because existing research findings and some specific items about having choice in class had been relatively well established.

In EFA, the seven items of the potential PC-K proved to have two factors as subscales. The value of KMO was .79 ($p < .001$). All the items had communalities from .66 to .81. As to the total variance, the model explained 71.34 %, satisfying the criterion that a factor-solution should identify over at least 40% of the total variance to define a factor structure (Gorsuch, 1983). The first subscale of the potential PC-K had an eigenvalue of 2.82 whereas the second subscale had a value of 2.17, explaining 40.30% and 31.04% of variance, respectively. Finally, four items, PC1-K, PC2-K, PC3-K, and PC7-K, loaded on the first subscale, all referring to having choice during classroom activities, whereas three items, PC4-K, PC5-K, and PC6-K, loaded on the second scale, which are more related to having choice in terms of evaluation. The factor loadings of PC1-K, PC2-K, PC3-K, and PC7-K were .89, .86, .73, and .75 respectively, and those of PC4-K, PC5-K, and PC6-K were .74, .78, and .85 respectively for the second factor.

Through all these analytic processes based on the five criteria described above, the nine items, PCAS3-K, PCAS12-K, PCAS13-K, PCAS20-K, PCAS21-K, PCAS22-K, PCAS23-K, PCAS24-K, and PCAS28-K, from the potential PCAS-K scale were deleted because of cross-loadings over more than two different factors and poor interpretability. In terms of PC-K, it had two factors, and retained all seven items.

According to theoretical and subjective criteria based on statistical evidences, the five factors for the final version of the PCAS-K were named as follows: (a) *Having Enough Time*, (b) *Thinking Differently, Exploring Multiple Solutions*, (c) *Self-directed Learning*, (d) *Communicating Actively between Instructor and Students*, and (e) *Having a Discussion among Students*. Also, the 5-factor model of PCAS-K with 19 items identified a good model fit (χ^2=132.42, df=86, RMSEA= .069), with a cumulative total variance explained of 71.66%.

In addition, the two factors for PC-K were named: (a) *Having Choice Related to Learning Tasks in Class*, and (b) *Having Choice Related to Evaluation such as Due Dates and Evaluation Methods* (see Table 13). The mean was 4.192 and standard deviation was 1.67 for the first factor, *Having Choice Related to Learning Tasks in Class*. The mean was 3.37 and standard deviation was 1.67 for the second factor, *Having Choice Related to Evaluation such as Due Dates and Evaluation Methods*. This indicated that Korean college students might experience or perceive relatively somewhat less chance of having choice related to evaluation compared to having choice related to learning tasks in class.

For interfactor correlations, the five factors of the PCAS-K scale identified moderate or somewhat high correlations (Table 11). The two factors of the PC-K scale

had a Pearson correlation of .56. However, there were no correlations over .85, which would have been problematic.

Table 11. Factor Correlation Matix for PCAS-K with 19 Items after EFA

Factor	Mean	SD	1	2	3	4	5
1	4.45	1.50	1.00				
2	4.67	1.47	.75	1.00			
3	4.43	1.49	.66	.68	1.00		
4	5.01	1.49	.69	.66	.59	1.00	
5	4.06	1.66	.74	.76	.65	.67	1.00

In addition, for the purpose of convergent validity, two extant scales related to autonomy support were administered along with the two new scales and entered into a multiple analysis. The mean scores of the four different scales were calculated –with the following results: PCAS-K (M=4.53), PC-K (M=3.83), Perceived Choice by Assor et al. (2002) (M=4.11), and Perceived Cognitive Autonomy Support by Tsai et al. (2008) (M=4.64). Considering their correlations, PCAS-K was correlated most highly with Perceived Cognitive Autonomy Support by Tsai et al. (2008) (r= .75). PC-K proved to be most highly correlated with Perceived Choice by Assor et al. (2002) (r= .86). These results demonstrated that the PCAS-K scale was more likely to be measuring the cognitive aspect of autonomy and that the PC-K scale was more likely to be measuring the perception of experiencing autonomy related to having choice in class.

Finally, both the PCAS-K with 19 items and the PC-K with 7 items were examined together using EFA in order to see if they were differentiated from each other, by loading on different factors. Using PCA and the Varimax rotation method in EFA, result indicated that the PCAS-K and PC-K scales were well differentiated into different factors. In total, the 26 items loaded on 4 different facors. All the PCAS-K items were put together into two different factors whereas all the 7 PC-K items loaded on the other two factors, showing that Korean undergraduates were differentiating these two different types of autonomy support given in class.

Reliability. In order to examine the reliabilities of both new scales, the final version of PCAS-K and PC-K, with each subscale, I used Cronbach's alpha. The final versions of the PCAS-K (19 items) and PC-K (7 items) showed Cronbach alpha of .96 and .86 respectively, which are considered very high. There were no specific items that when deleted, showed an increase of Cronbach alpha. Thus, both PCAS-K and PC-K proved to be reliable scales to measure students' perceived cognitive autonomy support and students' perception of having choice in class, respectively. Tables 12 and 13 present the final items separated into factors with means, standard deviations and factor loadings for each item, and the Cronbach alphas of each subscale.

Table 12. PCAS-K items, Means, Standard Deviations, and Standardized Factor Loadings from Exploratory Factor Analysis

Item	M	SD	(standardized) Loading	Cronbach alphha
				.96
Factor 1: Having Enough Time				.90
1.My instructor gives me enough time to think about what we learn in the classroom.	4.87	1.47	.54	
4. I have ample time for decision making in this class.	4.27	1.77	.80	
5. I have enough time to solve some questions by myself.	4.22	1.69	.89	
Factor 2: Thinking Differently, Exploring Multiple Solutions				.91
6. My instructor encourages me to present different approaches to the same issue or problem.	5.01	1.64	.91	
7. My instructor allows me to employ various sources in order to consider an issue or solve a problem.	4.65	1.64	.66	
9. I am allowed to use different methods to solve a problem.	4.35	1.72	.60	
10. My instructor gives me freedom to think in different ways.	4.76	1.75	.93	
14. My instructor encourages me to generate my own thinking.	4.58	1.81	.51	
Factor 3: Self-directed Learning				.91
15. I feel that I am the owner of my learning in this class.	4.66	1.70	.91	

Table 12 continued

16. I believe that I can make a decision about a class issue according to my own criteria.	4.15	1.82	.94	
17. My instructor encourages me to think about some information, rather than just telling us.	5.01	1.71	.55	
18. My instructor asks me to evaluate my own or other students' ideas.	3.97	1.81	.50	
19. My instructor helps me think about some issues in a critical way.	4.35	1.67	.47	
Factor 4: Communicating Actively between Instructor and Students				.83
11. My instructor welcomes different opinions.	5.26	1.74	.96	
25. I think that my instructor is open to debate.	4.66	1.77	.53	
29. I think my instructor listens carefully to what I am saying.	5.12	1.66	.64	
Factor 5: Having a Discussion among Students				. 87
2. I am allowed to spend time discussing some issues in class.	3.79	1.95	.48	
8. My instructor asks me to discuss multiple approaches.	4.14	1.80	.56	
27. I am encouraged to share ideas or expertise with others	4.26	1.85	.96	

Items that were deleted from PCAS-K scale

3. I have enough time to exchange ideas with others.

12. I feel that I am an independent thinker or problem solver through classroom activities.

13. I experience many chances to justify or argue for my points.

Table 12 continued

20. I am encouraged to compare or contrast different ideas by my teacher.
21. My teacher encourages me to relate the material presented in my class to my background knowledge.
22. My instructor pushes me to come up with some alternative ways to interpret something.
23. My teacher encourages me to think how to apply the knowledge I've just learned.
24. My instructor makes me generate questions about the ideas and issues we are learning.
26. I feel that my ideas are respected by my instructor and other classmates in this class.
28. My instructor does not make me feel dumb.
30. My instructor makes me feel like I am saying something meaningful.

Table 13. PC-K items, Means, Standard Deviations, and Standardized Factor Loadings of Exploratory Factor Analysis

Item	M	SD	Loading	Cronbach alpha
				.87
Factor 1: Having Choice Related to Learning Tasks in Class				.87
1. My instructor gives me chances to choose an assignment topic	4.02	2.07	.89	
2. My instructor allows me to choose materials to use in class projects.	4.12	1.90	.86	
3. I think I have freedom in how to handle materials to study.	4.40	1.79	.73	
7. My instructor gives me a chance to select the topic of the presentation or paper.	4.19	2.13	.75	
Factor 2: Having Choice Related to Evaluation such as Due Dates and Evaluation Methods				.77
4. My instructor provides me with an opportunity to choose evaluation procedures	3.45	1.92	.74	
5. I think I have some say in deciding due dates for assignments	3.28	1.91	.85	
6. My instructor allows me to choose my group members.	3.39	2.11	.78	

CFA. CFA (confirmatory factor analysis) is most commonly used in the process of scale development to identify the construct validity of a scale following EFA, measuring the model fit. Here, model fit refers to an ability of a specific model to reproduce the dataThat is, CFA is used to assess the goodness of fit of models to the data. Once a theoretically meaningful structure is developed through EFA, CFA has been recommended as a next step to specify the resulting factor solution (Worthington & Whittaker, 2006). For the purpose of the factor structure *reliability* and *validity* of each scale, both the 5-factor oblique structure for the PCAS-K and 2-factor structure of PC-K were examined, finding good fit of the models to the same data set (n=113).

In terms of estimation method, the ML (maximum likelihood) was used and FIML (Full information maximum likelihood estimation) was employed by selecting "Estimate means and intercepts" in the program.

The final 19 items for PCAS-K were administered to a new group of students (n=349) obtained from the Time 2 session in Study 2 (see Chapter 5). CFA was needed to see if each structure obtained from EFA fit the data, using Amos 18.0. For a careful decision, three different models were tested again: 1-factor, 2-factor, and a higher order factor model. In Table 12, the model fit summary for the goodness of fit is presented.

Commonly, the goodness of fit of models describes how well a model fits the data, the observed variables. In terms of the RMSEA (Root Mean Squared Error of Approximations) point estimate, .05 has been commonly used as the cutoff point for a good model fit (Hu & Bentler, 1999). According to Browne and Cudeck (1993), "a value of the RMSEA of about .05 or less would indicate a close fit of the model in relation to

the degrees of freedom" and a value of around .08 would imply a "reasonable error of approximation." A RMSEA value over .1 would not be accepted in applied research. However, it is said that following these criteria without carefully considering sample sizes and specific model specification would be problematic. For example, when the sample size is over 800 or 1000, the model rejection rate with the cutoff value of .05 approaches zero (Chen, Curran, Bollen, Kirby, & Paxton, 2008). According to Chen et al. (2008), the cutoff of .05 is too conservative for smaller sample sizes, such as for samples of less than 100. That is, there would be greater sampling errors for smaller N. In Study 1B, there were only 113 cases for both EFA and CFA, less than the ideal sample size of 200. Therefore, although the cutoff value of .05 has been widely used as a "golden rule of thumb," RMSEA values ranging from .06 to around .08 are considered to good as cutoff values. Many researchers have considered .01, .05, and .08 as excellent, good, and mediocre model fit, respectively (MacAallum, Browne, & Sugawara, 1996). In addition, if TLI (Tucker-Lewis Index) and CFI (Comparative Fit Index) are over .90, the model is regarded to have a good model fit (Bentler, 1990; Tucker & Lewis, 1973).

On the basis of these criteria, the final versions of the PCAS-K and PC-K scales after conducting EFAs were analyzed using CFA. Three different models with different numbers of factors were tested to see if thefive-factor solution could be better explained by one higher-order factor. After selecting the final model, if necessary, the model was attempted to be modified by deleting some items for a better fit according to the estimates given in the output such as standardized regression weights, variances, squared multiple correlations, and standardized residual covariances.

Table 14. PCAS-K: Model Fit Indices from Confirmatory Factor Analysis

	χ^2	df	CFI	TLI	RMSEA (90% CI)
Model 1 (1-factor)	431.833	153	.838	.819	.128 (.11, .14)
Model 2 (5-factor)	261.410	142	.931	.917	.087 (.07, .10)
Model 3 (higher-order factor model)	262.160	147	.933	.922	.084 (.07, .10)

As shown in Table 14, the goodness of fit of Model 1 was not acceptable, according to the RMSEA value and other fit indices. Model 2, the 5-factor model, was proved to fit the data well (CFI=.931; TLI=.917) and each standardized factor loading ranged from each factor loading was from .74 to .90, showing each factor loading significantly different from zero ($p<.001$) (Table 17). The SMC (squared multiple correlation) indicating explainability of each variable were all over .54. In addition, inter-correlations between factors ranged from .71 to .89, which were quite high (Table 18). The correlation estimates resulted in checking if a single higher- order PCAS-K factor would explain the high correlations between factors.

Model 3 also fit the data well (CFI=.933; TLI=.922). Each factor loading, the standardized regression weights, was from .74 to .94, which were a little higher than Model 2's factor loading ranges. The SMC were all over .55. Moreover, each factor loading between each five factor and one higher-order factor was from .84 to .94. The third model indicated a slightly better model fit than other two. These all indicated that the five factors as the first order factors were well explained by a single higher-order

factor as a secondary factor. Namely, PCAS-K was found to include various types of cognitive autonomy support, which could be applied to educational settings.

In the case of PC-K, three different models were estimated. All of them did not have acceptable model fits with these data, and Model 3 did not have even an output, implying it was under-identified.

Table 15. PC-K: Model Fit Indices from Confirmatory Factor Analysis

	χ^2	df	CFI	TLI	RMSEA (90% CI)
Model 1 (1-factor)	94.237	14	.793	.690	.226 (.18, .27)
Model 2 (2-factor)	51.346	13	.901	.841	.162 (.12, .21)
Model 3 (higher order factor model)			No Output		

As described above, the seven items of PC-K were estimated again, using a secondary approach for a better model fit to the data by deleting items. According to the estimates given in the output such as standardized regression weights, variances, squared multiple correlations, and standardized residual covariances, three items, PC5-K, PC6-K, and PC7-K, were all removed (Table 19). In Table 17, factor loadings and SMC (squared multiple correlations) were presented. The final model for PC-K had 4 items (PC1-K, PC2-K, PC3-K, and PC4-K) and the model fit the data quite well (CFI=.998; TLI=.993) (Table 16).

Table 16. The Model Fit for the Final PC-K

	χ^2	df	CFI	TLI	RMSEA (90% CI)
Final Model (1-factor)	2.435	2	.998	.993	.044 (.00, .19)

Table 17. Factor Loadings and Squared Multiple Correlations for 19 items of PCAS-K

Items	Standardized Regression Weights	SMC
Factor 1: Having Enough Time		
1.My instructor gives me enough time to think about what learn in the classroom.	.83	.69
4. I have ample time for decision making in this class.	.90	.80
5. I have enough time to solve some questions by myself.	.88	.77
Factor 2: Thinking Differently, Exploring Multiple Solutions		
6. My instructor encourages me to present different approaches to the same issue or problem.	.80	.63
7. My instructor allows me to employ various sources in order to consider an issue or solve a problem.	.78	.61
9. I am allowed to use different methods to solve a problem.	.81	.66
10. My instructor gives me freedom to think in different ways.	.88	.77
14. My instructor encourages me to generate my own thinking.	.84	.70
Factor 3: Self-directed Learning		
15. I feel that I am the owner of my learning in this class.	.81	.65
16. I believe that I can make a decision about a class issue according to my own criteria.	.77	.60
17. My instructor encourages me to think about some information, rather than just telling us.	.81	.65

Table 17 continued

18. My instructor asks me to evaluate my own or other students' ideas.	.86	.74
19. My instructor helps me think about some issues in a critical way.	.81	.66
Factor 4: Communicating Actively between Instructor and Students		
11. My instructor welcomes different opinions.	.83	.69
25. I think that my instructor is open to debate.	.74	.54
29. I think my instructor listens carefully to what I am saying.	.81	.66
Factor 5: Having a Discussion among Students		
2. I am allowed to spend time discussing some issues in class.	.80	.64
8. My instructor asks me to discuss multiple approaches.	.82	.68
27. I am encouraged to share ideas or expertise with others	.87	.76

Table 18. Correlations between Factors for the five PCAS-K factors

	F1	F2	F3	F4	F5
F1	1				
F2	.77	1			
F3	.78	.84	1		
F4	.71	.79	.79	1	
F5	.78	.86	.89	.79	1

Table 19. Factor Loadings and Squared Multiple Correlations for 4 items of PC-K

Items	Standardized Regression Weights	SMC
Factor 1: Having Choice Related to Learning Tasks and Evaluation in Class		
1. My instructor gives me chances to choose an assignment topic	.74	.55
2. My instructor allows me to choose materials to use in class projects.	.94	.89
3. I think I have freedom in how to handle materials to study.	.75	.57
4. My instructor provides me with an opportunity to choose evaluation procedures	.58	.34

Chapter 5

Study 2

Purpose

The purpose of Study 2 was to examine how different types of autonomy support, in particular *perceived cognitive autonomy support* and *perceived choice,* were associated with different phases of *student interest,* that is *situational interest* and *individual interest*, mediated by different levels of cognitive engagement, *surface processing* and *deep processing*. It was hypothesized that students' perceptions of different types of autonomy in class would be associated with students' feelings of interest differently and that the relationship between autonomy and interest constructs would be associated with different levels of cognitive processing.

In particular, I hypothesized that students' perceptions of cognitive autonomy support would be related to students' individual interest, mediated by deep processing of cognitive engagement positively. To investigate the interrelationship among these variables and test the hypothesized model fit, SEM (structural equation modeling) was used.

Research Questions

Study 2 was guided by the following main research questions:

1. As to the relationship between students' initial interest and different types of student interest, that is, situational interest and individual interest, at the end of the semester:

1a) Is students' initial interest directly related to different types of student interest?

1b) Is the relationship between students' initial interest and different types of student interest, situational interest and individual interest mediated differently by different types of autonomy support in class, that is, perceived cognitive autonomy support and perceived choice?

2. As to the relationship between perceived cognitive autonomy support and different types of student interest at the end of the semester:

2a) Is perceived cognitive autonomy support directly related to different levels of student interest in different ways?

2b) Is the relationship between students' perceived cognitive autonomy support and situational and individual interest mediated differently by different levels of cognitive engagement, that is, surface processing and deep processing?

3. As to the relationship between students' perceived choice and different types of student interest at the end of the semester:

3a) Is perceived choice directly related to different types of student interest in different ways?

3b) Is the relationship between students' perceived choice and different types of student interest (situational interest and individual interest) mediated differently by different levels of cognitive engagement (surface processing and deep processing)?

4. As to the relationship between students' situational interest and individual interest:

4a) Is situational interest directly related to individual interest?

Method

Participants

Study 2 was conducted at a large university in Seoul, Korea in the fall semester of 2012. Data were collected twice: Time 1 (the first or second day of the semester) to measure students' initial interest and Time 2 (12 weeks into the fall semester) to administer the remaining scales. Participants were undergraduate students who were enrolled in a section of the school-wide writing course. Participants were recruited in the same way as were the participants of Study 1. There are about 25 instructors who were teaching freshmen and sophomores one or two sections of the College Writing course. In one semester, about 1500 freshmen and sophomores, sometimes including a few juniors or seniors, were taking the course. In common, there were about 50 to 60 sections per semester accommodating from 25 to 30 students in each section. Before the fall semester started, the instructors were contacted via email to explain the purpose of the study in brief and to request them to encourage their students to participate in the study.

With students' and instructors' agreement, 360 participants responded to the Time 1 survey asking about their initial interest in the writing course. At Time 2, 349 undergraduate students completed a total of six measures, including the PCAS-K, PC-K, Surface Processing, Deep Processing, Situational Interest, and Individual Interest scales. Their identification was checked by using a four-digit number (the last four digits of their

cell phone number) reported on each survey at Time 1 and Time 2. Although there were 360 participants at Time 1 and 349 participants at Time 2, only 263 students participated in both surveys at Time 1 and Time 2. A few additional cases were also excluded because of missing data. These were found in the process of checking the modification indices for a better model fit. There are several ways of dealing with missing data: listwise deletion, pairwise deletion, mean substitution, and so forth. In this study, the additional three cases with missing data were also deleted according to listwise deletion method because there were so few. The final number of participants in the study was 260.

Participants were taught by 11 different instructors who were teaching with the identical writing course packet but each in their own way with different teaching methods and different additional sources. Some of the instructors taught two or three sections. There were approximately 20 students per class. From the demographic data gathered, there were 141 women (54%) and 119 men (46%) (Mean age=21.98 years; SD=.58). Of the participants, 91.9% indicated they were freshmen, 3.1% sophomores, 2.3% juniors, and 2.7% seniors. Their majors varied. The distribution of majors was 19% Liberral arts (n=53), 15% Natural science (n=41), 9% Education (n=25), 6% Engineering (n=19), 29%Social Science (n=57), 14% Business (n=39), 4% Fine arts (n=13), and 4% others including Nursing and Communication (n=13).

Procedures

Data were collected at both Time 1 (the first or second day of class) and Time 2 (12 weeks into the semester) from 11 instructors' courses. The purpose of the writing course was to teach students academic and professional writing skills. Students were

likely to discuss topics in small groups and have several writing assignments across the semester. Although there was a designated writing course packet, instructors had the freedom to create their own curriculum according to their own teaching philosophy, various teaching resources, and different course schedules. Despite some limitations concerning the generalizability of the study findings, I expected to be allowed to capture different types of autonomy support by different teachers, as their own teaching styles were likely to differ.

Upon instructors' and their students' agreement, a specific date and time was scheduled for me to distribute surveys. At Time 1, students were asked to fill out a questionnaire asking their initial interest in the writing course along with their demographic information including gender, classification, major, and a four-digit number (the last four digits of their cell phone number) to match students' responses from Time 1 to Time 2 survey. At Time 1, the surveys took less than 10 minutes for participants to complete. At Time 2, participants from these same classes were asked to fill out six questionnaires measuring PCAS-K, PC-K, student interest (including both situational and individual interest), and cognitive engagement (including surface and deep processing). The second survey took less than 30 minutes to complete.

Measures

Participants responded to seven instruments in total at Time 1 and Time 2: Initial interest, PCAS-K, PC-K, Deep processing, Surface Processing, Individual interest, and Situational interest. All these scale used a 7-point Likert scale, from 1 (not at all true of me) to 7 (very true of me). Cronbach's alpha was calculated to assess each scale's and

subscale's reliability, and CFA (confirmatory factor analysis) was used to identify construct validity. The number of items in the following measures was reduced through validating measurement models for the final structural model. Most importantly, the final items after CFAs for the main study were examined through multicollinearity detection, using linear regression in SPSS 18.0. In terms of VIF (variance inflation factors), all of the VIF ranged from 1.72 to 2.83. Thus, there was no condition in which the independent variables were highly correlated.

Initial interest. With respect to preexisting individual interest, Hidi and Renninger (2006) noted that "although situational interest represents the initial phases of the development of individual interest, there are multiple possibilities for the person with an existing individual interest to experience related situational interests" (p. 117). This seems to imply that although some individuals already have preexisting individual interest in a specific area, the existing interest can also be affected by situational factors in a particular context. For instance, some learners having asubstantial amount of individual interest in writing could lose their interest if they find themselves in an uninteresting situation over time.

However, most of the literature concerning the construct of student interest considers initial interest important for its possible impact on the dependent variables and for a careful examination of its development (Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008). For instance, some researchers posit that psychological states of interest may be triggered when contents are perceived as relevant to the interest that the individual brings to a situation (Tsai, Kunter, Ludke, & Trautwein, 2008). That is,

situational interest in a specific condition can interact with the individual interest that individuals bring to a task. It is natural that students' interest may also be influenced by external stimuli and support in the given specific situation, and that it can be triggered and maintained in different ways. For example, students who come to an introductory class with a well-developed individual interest may deepen their individual interest if they experience more value or meaning in the course (Harackiewicz et al., 2008).

For the purpose of providing an initial baseline and to establish that there were initial differences, students' initial interest in the writing course was measured on the first or second day of the semester. Also, it was hypothesized that students having high initial interest in the writing course would respond to a classroom environment with high cognitive autonomy supportive more positively than students with less initial interest.

The questionnaire included seven items rated on a 7-point scale (1-not at all true of me, 7-very true of me). Example items include "I've always been fascinated by this topic" and "I'm really looking forward to learning more about this topic." This scale was used in Harackiewicz et al.'s (2008) study to measure students' initial interest, with a high reliability of 0.90 (Cronbach's alpha coefficient). After conducting CFA (confirmatory factor analysis) with my data (n=260), three items, Initial1, Initial2, Initial3 of the seven items were deleted for better validity (RMSEA=.09; TLI=.98; CFI=.99). In my study, the Cronbach alpha with four items was .89.

Situational interest. Students' assessment of their situational interest was measured 12 weeks into the term, using what Linnenbrink-Garcia et al. (2010) developed to differentiate three factors of situational interest: *triggered-SI* (situational interest)

focusing on students' attention and affective reactions to a course in general; *maintained-SI-feeling* referring to affective reactions to domain content experienced in the classroom (enjoyment); and maintained *SI-value* (value and importance). Linnenbrink-Garcia et al. (2010) demonstrated that these three factors were distinct from one another, noting that their measure would be appropriate when needing to assess situational interest across various academic areas in different levels of school settings, from middle school to college contexts.

There were 12 items on the scale, which were modified for this study by exchanging *math* with *this course*: *Triggered-SI* (e.g., "When we take this course, my instructor does things that grab my attention"); *Maintained-SI-Feeling* (e.g., "What we are learning in this class this semester is fascinating to me"); and *Maintained-SI-value* (e.g., "What we are learning in this class this semester can be applied to real life"). The items were rated on a 7-point scale. The Triggered-SI (Cronbach's alpha= .86), Maintained-SI-Feeling (Cronbach's alpha= .92), and Maintained-SI-Value (Cronbach's alpha= .88) had high reliabilities in Linnenbrink-Garcia et al.'s (2010) study. Among these three subscales of situational interest, the only two subscales, the triggered-SI and maintained-SI-feeling, were used for my study in that (a) many items of the Maintained-SI-Value loaded on the factor designating individual interest in this study, and (b) that theoretically the third subscale, the Maintainted-SI-Value, with its four items, SI4, SI10, SI11, SI12, shared the most sense with individual interest subsuming values. The Cronbach's alpha for the remaining item scales in this study with five items was .96. After conducting CFA, three items, SI1, SI5, SI6, mostly from the first subscale called

Triggered-SI were deleted for a better validity (RMSEA=.07; TLI=.99; CFI=1.00), leaving five items, SI2, SI3, SI7, SI8, and SI19.

Individual interest. Students' individual interest was measured about 12 weeks into the semester. Individual interest was assessed using an adapted version from the "Motivated Strategies for Learning Questionnaire" (MSLQ; Pintrich, Smith, Garcia, & Mckeachie, 1993). There were eight items on the scale (Cronbach's alpha= .90) (see Linnenbrink-Garcia et al., 2010). The scale was designed to cover both feeling and value components. For instance, questions include: "This course is practical for me to know," "This course helps me in my daily life outside of school," "It is important to me to be a person who writes well," and "I enjoy doing this course." Students indicated their individual interest based on a 7-point scale, raging from 1 (not at all true of me) to 7 (very true of me). In this study, the Cronbach alpha for the six items that remained after conducting factor analysis was .94. After conducting CFA, one item (IN1) of six items on the scale was delected with a good model fit (RMSEA=.05; TLI=.99; CFI=1.00).

Surface/ deep cognitive processing. Students' different levels of cognitive engagement were measured 12 weeks into the semester by a 5-item measure of deep processing and a 5-item measure of surface processing cognitive study strategies, originally used by Elliot, McGregor, and Gable (1999). In their study, Cronbach alphas were .74 and .66 respectively. These were also rated on a 7-point scale.

For surface processing, the scale included the following items: "When studying for this course, I read the text and my notes over and over again to help me remember the material" and "I study for this course by memorizing the definitions at the end of each

chapter of the text." For deep processing, the instrument contained the following items: "I treat the course material as a starting point and try to develop my own ideas about it" and "I try to think through topics and decide what I'm supposed to learn from them, rather than studying topics by just reading them over." In this study, Cronbach alphas were .60 for the deep processing subscale and .88 for the surface processing subscale. Also, DP4 was a reversed-scored item. After conducting CFA, SP had a better model fit in the data set by deleting one item, SP2 (RMSEA=.05; TLI=.99; CFI=1.00). After CFA, DP was found to have an unacceptable RMSEA value but TLI and CFI estimates were acceptable in the data (RMSEA=.10; TLI=.95; CFI=.98). Also, for keeping as much information as possible in this phase before conducting the main analysis, I decided not to delete more items for a better RMSEA value.

PCAS-K (perceived cognitive autonomy support, Korean version). Participants were asked to respond to the final version of the Perceived Cognitive Autonomy Support (PCAS-K) scale, developed through Study 1, at 12 weeks into the semester. This scale measured whether students perceived instruction as supportive of their ownership of their own thinking and learning. The sample items included: "I am allowed to spend time discussing some issues in class," "My instructor encourages me to present different approaches to the same issue or problem," and "I experience many chances to justify or argue my points." The Cronbach's alpha with the final 19 items for this study was .95.

Given the findings in Study 1B, a single higher-order factor, PCAS-K, explained the relationships among the five factors as subscales in the final version. The five factors were named as follows and each factor's reliability was calculated using the 260 cases in

Study 2: (a) *Having Enough Time* (three items, PCAS1-K, PCAS4-K, and PCAS5-K, α=.85), (b) *Thinking Differently, Exploring Multiple Solutions* (five items, PCAS6-K, PCAS7-K, PCAS9-K, PCAS10-K, and PCAS14-K, α=.88), (c) *Self-directed Learning* (five items, PCAS15-K, PCAS16-K, PCAS17-K, PCAS18-K, and PCAS-19, α=.85), (d) *Communicating Actively between Instructor and Students* (three items, PCAS11-K, PCAS25-K, and, PCAS29-K, α=.84), and (e) *Having a Discussion among Students* (three items, PCAS2-K, PCAS8-K, and PCAS27-K, α=.71).

For the PCAS-K scale, composite scores were used to provide subscale indicators of a latent variable PCAS-K for SEM in Study 2. That is, the PCAS-K scale was the second higher-order factor with five first order factors as derived in Study 1B. Each first-order factor was considered an individual observed variable and calcualated by averaging the scores of the final items in each first order factor.

Through CFA (confirmatory factor analysis), 19 items of PCAS-K were found to have .085 as RMSEA value (TLI=.89; CFI=.91). Although these estimates were not entirely satisfactory, all 19 items were kept for testing the final model as a next step, for the purpose of providing more information.

PC-K (perceived choice, Korean version). Students' perceived choice was measured at 12 weeks into the semester, using the final version of the scale generated from Study 1 with four items rated on a 7-point each. The sample questions included the concept about having choice in class: "My instructor gives me chances to choose an assignment topic" and "My instructor allows me to choose materials to use in class projects." Cronbach's alpha with the final four items, PC1-K, PC2-K, PC3-K, and PC4-K

for this main study was .80 in Study 2. In terms of conducting CFA for PC-K, it was proved to fit the data perfectly (RMSEA=.00; TLI=1.00; CFI=1.00).

Hypotheses

On the basis of theoretical rationales, this study tested the following hypotheses:

1. As to the relationship between students' initial interest and different levels of student interest such as situational interest and individual interest at the end of the semester: Students' initial interest will be associated with different levels of student interest and its relationship will be mediated by two different types of autonomy support.

1a) Students' initial interest will be positively related to different levels of student interest. The higher students' initial interest is, the more interest likely the students will have at the end of the semester.

1b) The relationship between students' initial interest and different levels of student interest such as situational interest and individual interest will be mediated differently by different types of autonomy support in class such as PCAS and PC.

1b-1) Students' initial interest will be indirectly and also positively related to thieir individual interest through higher levels of PCAS (perceived cognitive autonomy support) and relatively lower levels of PC (perceived choice).

1b-2) In addition, students' initial interest will be indirectly and also positively related to their situational interest through higher level of PC and relatively lower level of PCAS.

2. As to the relationship between PCAS (perceived cognitive autonomy support) and different levels of student interest at the end of the semester: Students' PCAS will be associated with different levels of student interest and its relationship will be mediated by two different levels of cognitive engagement such as surface processing and deep processing.

2a) Students' PCAS will be positively related to different levels of student interest. The more cognitive autonomy support students perceive in class, the higher individual interest students will have at the end of semester, compared to situational interest.

2b) The relationship between students' PCAS and different levels of student interest such as situational interest and individual interest will be mediated differently by different types of cognitive processing.

2b-1) Students' PCAS will be indirectly and also strongly related to students' individual interest through meaningful levels of cognitive processing, what is termed *deep processing* in this study.

2b-2) Students' PCAS will be indirectly and relatively moderately or somewhat weakly related to students' situational interest through lower level of cognitive processing, what is termed *surface processing* in this study.

3. As to the relationship between PC (students' perceived choice) and different levels of student interest at the end of the semester: Students' PC will be associated with different levels of student interest and its relationship will be mediated by two different levels of cognitive engagement, surface processing and deep processing.

3a) Students' PC will be positively related to different levels of student interest. The more chances to have choice in learning tasks students perceive in class, the higher situational interest students will have at the end of semester, compared to individual interest.

3b) The relationship between students' PC and different levels of student interest such as situational interest and individual interest will be mediated differently by different types of cognitive processing.

3b-1) Students' PC will be indirectly and also strongly related to students' situational interest through shallow level of cognitive processing, what is termed *surface processing* in this study.

3b-2) Students' PC will be indirectly and relatively moderately or somewhat weakly related to students' individual interest through meaningful level of cognitive processing, what is termed *deep processing* in this study.

4. As to the relationship between students' situational interest and individual interest: Students' situational interest will be associated with individual interest.

4a) Students' situational interest will be positively related to individual interest.

Data Analysis

The main form of analysis in Study 2 was correlational, using SEM (structural equation modeling) with Amos (Analysis of Moment Stuructures) 18.0 version. SEM is a statistical technique that integrates path analysis and factor analysis. Its focus is the analysis of covariance structure. It is conducted in two steps: validating the measurement model through CFA (confirmatory factor analysis) and fitting the structural model with path analyses among latent variables. In other words, SEM was conducted to test the hypothesized model fit among latent variables and to investigate a structural theory among the constructs of interest. The model fit indicates the degree to which the covariance predicted by the model is associated with the observed covariance in the given data.

Generally, SEM has several advantages over other statistical procedures such as path analysis, regression analysis, or multivariate analysis of variance: (a) it controls measurement errors by estimating and removing the errors and allowing only common variance while testing multiple latent variables, (b) it explores direct and indirect relationships simultaneously among key variables, possibly having more than one dependent variable, and (c) it allows examination of several alternative models based on theoretical support by providing model fit indices given the sample data.

The first step was 1) CFAs (confirmatory factor analysis) for each latent variable in this Study 2 for the purpose of validity before analyzing measurement and structural

models. The results of these CFAs have already been presented in the section of Measure above. Based on these findings, next, 2) a measurement model was tested and modified for better model fit by checking the model fit and estimates such as standardized regression weights, variances, squared multiple correlations, and standardized residual covariances. In this study, the model was estimated and evaluated to explore the interrelationship among students' initial interest, PCAS, PC, surface cognitive processing, deep cognitive processing, situational interest, and individual interest. And then, 3) initial and final structural models were examined.

Results: Findings of Study 2

Preliminary Analyses

Data Screening. First, skewness (< 2) and kurtosis (<4) of the data were examined before measurement models analysis according to the criteria proposed by Kline (1998). Normality of distribution was checked with all the variables, and all the items. There was no indication of any problem with skewness and kurtosis in the data for this study. Also, all participants with missing data had their full data deleted because retaining the data with missing answers could be problematic and biased (Brown, 2006).

Gender differences. For the purpose of examination of gender difference, independent t-tests comparing male and female participants were conducted. There were 119 male students and 141 females for Study 2. Using independent-samples t-tests, each string of variables for each factor, seven factors in total, was tested for difference between male and female students. The results did not show any significant gender differences ($p<.05$) in any construct. As such, each effect size of the differences was also

examined with the criteria of Cohen's d, using both group means and group standard deviations (Cohen, 1988). Again, all of the constructs proved to have no significant gender differences

Descriptive statistics and correlations among key latent variables. Using bivariate correlation in SPSS, both descriptive statistics and correlations were calculated with a sample size of 260 for Study 2. As shown in Table 20, several key latent variables were moderately or highly correlated. In particular, students' individual interest was highly correlated with students' situational interest ($r=.92$, $p<.01$), as was students' perceived cognitive autonomy support, which was also somewhat highly correlated with students' individual interest ($r=.75$, $p<.01$).[1]

[1] Very high correlations between variables might prove problematic for SEM, especially when the correlation would be over .90, which might be associated with multicollinearity between independent variables. In this study, the high correlation between SI and IN might be one of the limitations in this study. Remedies were administered by checking factor analysis results, deleting some items based on theory and statistics. However, deleting items resulted in a poor model fit. Thus, the relationship between them and any other possible problems were decided to be checked in the measurement model assessment phase. In fact, the relationship between SI and IN was the association between independent variable and dependent variable. Also, the high correlation was anticipated in a degree. The relationship between SI and IN would not be dichotomous but spiral, interactive, and developmental because commonly SI would develop into IN over time by sharing much part of both emotion and cognition as described in the theoretical review section above (Hidi, 1990).

Table 20. Descriptive Statistics and Correlations between Key Variables

	Initial	PCAS	PC	SI	IN	DP	SP
Initial	-						
PCAS	.17**	-					
PC	.05	.64**	-				
SI	.20**	.73**	.48**	-			
IN	.21**	.75**	.50**	.92**	-		
DP	.19**	.47**	.38**	.56**	.57**	-	
SP	.12	.50**	.38**	.52**	.53**	.60**	-
M	5.83	5.42	4.88	4.95	5.21	4.50	4.44
SD	.95	.91	1.22	1.44	1.33	0.88	1.35

Note. *p<.05, **p<.01. N=260. Initial: Initial Interest; PCAS: Perceived Cognitive Autonomy Support; PC: Perceived Choice; SI: Situational Interest; IN: Individual Interest; DP: Deep Processing; SP: Surface Processing.

Main Analyses

Test of Measurement Models. For the purpose testing goodness of fit with the final measurement model, theoretical and statistical examination was iteratively conducted in this phase. Through CFA, both the chi-square test statistics and model fit indices were employed to decide on a final measurement model because using only the chi-square statistics is known to be sensitive to sample size and frequently results in a false decision.

According to Hu and Bentler (1999), acceptable or even good models indicate values for CFI (comparative fit index) over .90 or around .95, a more stringent value. In addition, RMSEA (Root Mean Square Error of Approximation) of less than .06 with SRMR of less than .08 are recommended to retain the right model, indicating close fit. The RMSEA measure is based on the chi square to df (degrees of freedom) ratio. According to MacCallum, Browne, and Sugawara (1996), .01, .05, and .08 indicate excellent, good, and mediocre fit respectively. However, a value less than .10 is considered as the cutoff for poor fitting models. In common, models with small df and low sample sizes tend to have large values of RMSEA. Considering these references, in the current study, a RMSEA value of less than around .08 was used as a maximum cutoff value in establishing model fit and a RMSEA of less than .05 was considered to represent good model fit to the data (MacCallum, Browne, & Sugawara, 1996).

SRMR refers to the standardized root mean square residual, which is an absolute measure of fit, the standardized difference between the observed correlation and the predicted correlation. A SRMR value of zero designates a perfect fit. As sample size and the number of parameters increase, the SRMR measure is more likely to be smaller. In particular, a value less than .08 is regarded as a good model fit (Hu & Bentler, 1999). In some cases, a value of less than .10 is considered acceptable. Also, this measure is preferred to report in many studies using CFA or SEM because it is not affected by the complexity of a model. The SRMR was checked in the *plugins* section of Amos (18.0 version). In the present study, the cutoff was .08.

Results were obtained by first using CFA for each latent variable with all the latent variables correlated in Amos 18.0. All the measurement error was assumed to be uncorrelated. After running CFA for the initial measurement model, each standardized estimate between each observed variable and each corresponding latent variable was examined as the covariances between latent variables were checked.

The results of CFA showed that the standardized regression weights between each observed and its latent variable ranged from .51 to .95 in the initial measurement model. According to Brown (2006), a factor loading over .30 or .40 is an acceptable cutoff. Most of these were fairly good by having values over .50, suggesting that each item was strongly correlated to its corresponding latent variable. Second, with respect to the covariance matrix, most of the latent variables were moderately but sometimes highly correlated with each other.

Table 21. Summary of Model Fit Indices for Measurement Models

Model	χ^2	df	*p*	TLI	CFI	SRMR	RMSEA	90% C.I RMSEA
Initial Measurement	875.579	443	.000	.934	.941	.062	.061	.055, .067
Final Measurement	515.837	326	.000	.967	.972	.038	.047	.040, .055

For the initial measurement model, the value of χ^2 was high (χ^2=875.597, p<.001) with CFI value of .94 and TLI (NNFI=.93) (see Table 21). Most of all, the RMSEA of .06 with a SRMR of .07 could be considered acceptable. However, because of the high χ^2 (p< .001) and unacceptable 90% confidence interval of RMSEA, respecification was conducted by 1) checking high covariances between errors of each observed variable and drawing covariance between them and then 2) deleting a small number of items for a final measurement model for the purpose of better fit, considering the following criteria: highly cross-loaded items indicating multidimensionality, negative variance, poorly or inappropriately worded items in the given context of a college writing course, low factor loadings (standardized regression weights) of less than .30 or .40 items having little explained variance, standardized residuals covariances (Brown, 2006; Kline, 2005).

First, three error correlations were added in the initial model. For example, MI indicated the highest covariance between PCAScomp1 and PCAScomp5. This suggestion was reasonable in that PCAScomp1 (*Having Enough Time*) could be highly associated with PCAScomp5 (*Having a Discussion among Students*). According to the second suggestion, the second error correlation was added between SI2 (“What we are learning in college writing class this year is fascinating to me”) and IN5 (“I enjoy the subject of college writing”). This seemed reasonable in that both items were related to the feeling of enjoyment in the writing class. Likewise, a final error correlation was added between SI7 and IN3.

Then, examining the output estimates such as SMC and standardized residual covariances tables, deleting items was administered for a better model fit. At the same

time, I checked if deleting items was acceptable by looking into theoretical plausibility as well as statistical evidence. First, through careful consideration along with statistical suggestions, four items, SP1 (surface processing), DP4 (deep processing), IN2 (individual interest), and PC4 (perceived choice), were deleted in order for the final measurement model to achieve acceptable levels of fit with the data.

Then, theoretical plausibility was also checked. For example, SP1 ("When I study for the exam, I try to memorize as many facts as I can") would not be properly applicable to a college writing course in that students in the course were commonly required to write something on some given topic rather than having exams. Therefore, deleting SP1 seemed reasonable because it reduced the χ^2 value from 875.579 to 807.359 and simultaneously it was theoretically and subjectively plausible. In the case of DP4 ("I never question the validity of the theories presented in the text or by the profession" (reversed)), having questions or doubts about the 'validity' of the theories taught by an instructor might not often happen in a class because students were taking a beginning level of college writing course. Thus, deleting this item seemed plausible statistically and also theoretically.

As a result, the final measurement model had 23 items and 5 composite scores for PCAS-K even though there were 27 items and 5 composite scores in the initial measurement model. The intercorrelations between latent variables after item deletion are presented in Table 22. PCAS-K was highly correlated with both SI and IN and it was highly correlated with DP (deep processing) and SP (surface processing).

RMSEA of less than .05 in the final measurement model was considered to represent a good model fit to the data (MacCallum, Browne, & Sugawara, 1996). Standardized regression weights, the factor loadings, in the final model ranged from .63 to .95, which were somewhat improved, compared to the factor loadings in the initial measurement model.

Table 22. Intercorrelation between Variables after Item Deletion in the Measurement Model Test Phase

	Initial	PCAS	PC	SI	IN	DP	SP
Initial	-						
PCAS	.17**	-					
PC	.07	.63**	-				
SI	.20**	.73**	.46**	-			
IN	.20**	.73**	.47**	.93**	-		
DP	.24**	.59**	.41**	.64**	.63**	-	
SP	.12	.50**	.32**	.52**	.50**	.65**	-

Note. *p<.05, **p<.01. N=260. Initial: Initial Interest; PCAS: Perceived Cognitive Autonomy Support; PC: Perceived Choice; SI: Situational Interest; IN: Individual Interest; DP: Deep Processing; SP: Surface Processing.

***Test of Structural Models*.** Based on the findings of the final measurement model, the next phase of modeling was to explore the causal effects among factors of interest through direct and indirect effects, testing the hypotheses I had advanced.

Initial Structural Model.

The goodness of the fit of the initial structural model did not satisfy the cutoff criteria as shown in Table 23, especially in terms of the 90% confidence interval of the RMSEA. The 90% confidence interval (CI) has been used as one of the alternative ways to assess the goodness of model fit (Kelly & Lai, 2011; Raykov & Widaman, 1995). In common, the lower limit of the 90% CI of the RMSEA is recommended to be less than .05. In addition, SRMR was over .10 in the initial structural model. Accordingly, some respecifications were made according to the suggestions of the Modification Indices (MI) and theoretical support in adding some correlations between errors to the initial structural model. Multiple models were tested. Examining the MI (modification indices) several times for a better model fit, two high covariances between the errors of latent variables in total were detected. The first covariance occurred between the errors of PCAS-K and PC-K, which was anticipated in that they were all measuring the perception of autonomy support in relation to the feeling of freedom in class. The second high covariance happened between the errors of the latent variables of SP (surface processing) and DP (deep processing). The moderate correlation between SP and DP (r=.06) seemed to result in the somewhat high covariance. Theoretically, it was plausible in that the two distinct levels of cognitive processing would interact with each other. Thus, adding error correlation between then was acceptable.

Table 23. Summary of Model Fit Indices for Measurement and Structural Models

Model	χ^2	df	*p*	TLI	CFI	SRMR	RMSEA	90% C.I.
Initial Measurement	875.579	443	.000	.934	.941	.062	.061	.055, .067
Final Measurement	515.837	326	.000	.967	.972	.038	.047	.040, .055
Initial Structural	724.902	330	.000	.933	.941	.150	.068	.061, .075
Final Structural	522.510	328	.000	.967	.971	.042	.048	.040, .055

Test of the Structural Models: The Final Structural Model.

The model fit indices for the final structural model are presented in Table 17. The χ^2 statistic was statistically significant (χ^2=522.51, p<.001), suggesting that the model did not fit the data well. However, other indices were satisfactory, meeting the criteria for a good model fit to the data. For instance, the CFI of .97 was over the value of .95, which was presented as a more stringent value by Hu and Bentler (1999). Also, a SRMR of less than .08 is recommended to retain the right model, indicating close fit. In the final structural model, SRMR was .042 which indicated a very good fit. Therefore, the final structural model fit the data better than the initial structural model (Table 23).

Table 24. The List of Final Items in the Final Structural Model

Latent Variable	Item	Standardized Factor Loadings	Standardized Errors	Squared Multiple Correlations
PCAS-K	PCAScomp1	.73	-	.53
	PCAScomp2	.88	.08	.78
	PCAScomp3	.89	.08	.80
	PCAScomp4	.85	.08	.72
	PCAScomp5	.79	.07	.62
PC-K	PC1-K	.63	-	.40
	PC2-K	.80	.13	.65
	PC3-K	.88	.13	.78
Initial	Initial4	.72	.80	.52
Interest	Initial5	.80	.72	.63
	Initial6	.94	.71	.89
	Initial7	.82	-	.67
Surface	SP3	.78	.06	.61

Table 24 continued

Processing	SP4	.91	.05	.82
	SP5	.90	-	.81
Deep	DP1	.76	.11	.57
Processing	DP2	.79	.10	.62
	DP3	.88	.11	.78
	DP5	.70	-	.50
Situational	SI2	.90	-	.82
Interest	SI3	.92	.04	.85
	SI7	.89	.04	.80
	SI8	.88	.04	.77
	SI9	.90	.04	.82
Individual	IN3	.90	.04	.81
Interest	IN4	.91	.03	.84
	IN5	.93	.03	.86
	IN6	.94	-	.90

As the second phase of testing the final structural model, a chi-square difference between the final measurement model and the final structural model was calculated to check if they showed a statistically significant different fit. No significant difference implied that choosing the final structural model of interest rather than the final measurement model would not be problematic. In the current study, there was no significant chi-square difference between the two models ($\Delta\chi^2$=6.67, Δdf=2, p>.05). Thus, the final structural model was chosen in order to examine the research questions.

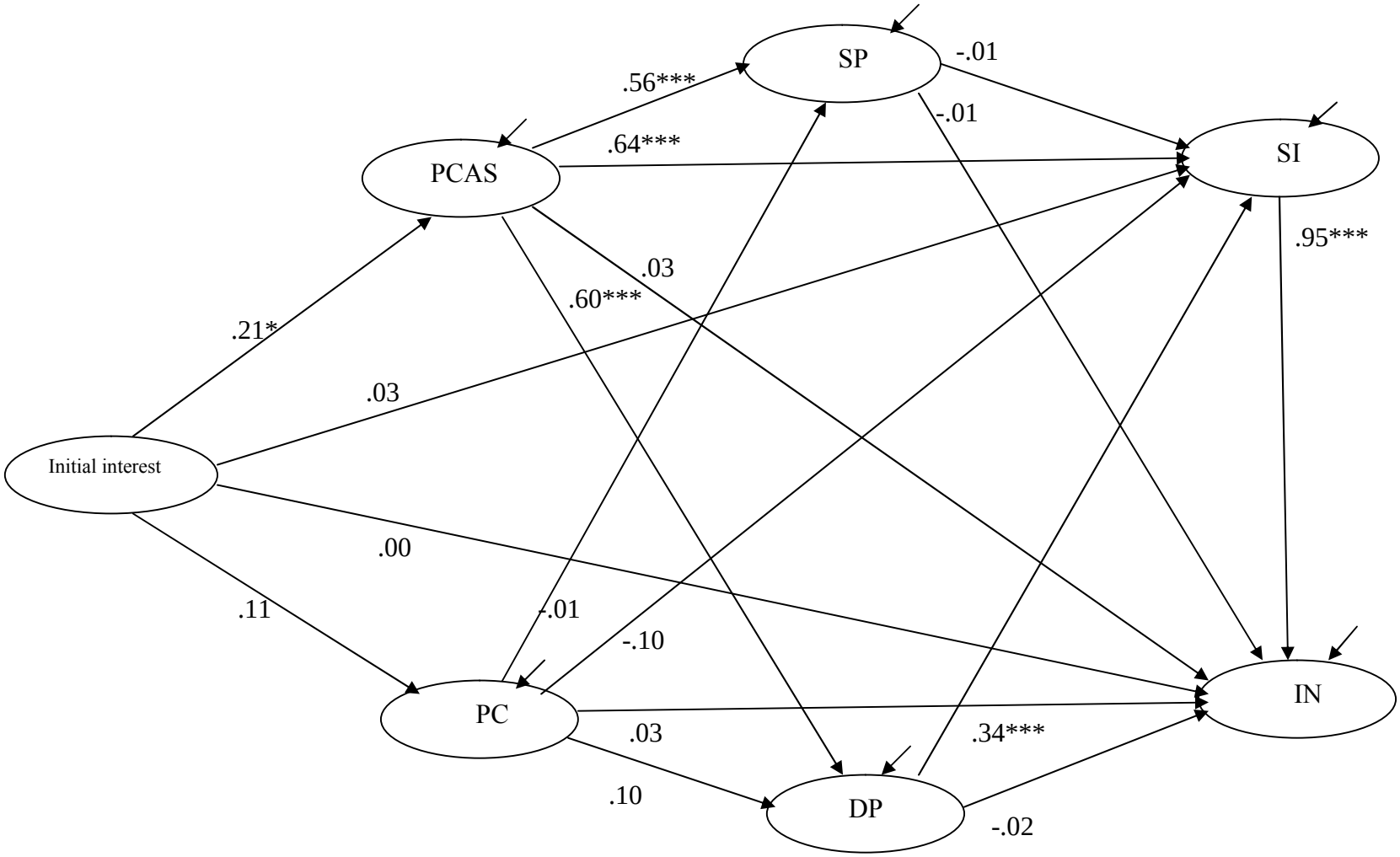
First, I examined both the standardized path coefficients, which are like beta weights in regression analyses, and the p values to check the correlations among latent variables (see Figure 2). In particular, the results indicated that the scores on PCAS-K and DP (deep processing of cognitive engagement) were positively and strongly correlated (β=.60, p<.001). PCAS-K positively predicted SI (situational interest) at the end of the semester (β=.64, p<.001). However, the relationship between PCAS-K and IN (individual interest) was not statistically significant (β=.03, p>.05). In addition, Initial (initial interest) predicted only PCAS-K, not PC-K. Very interestingly, PC-K was not associated with any other latent variables.

Regarding the meditation of relationships, several relationships between the latent variables were partially or fully mediated by other latent variables. The direct and indirect relationships among PCAS-K and two different types of student interest were tested. PCAS-K was directly related to SI (situational interest) (β=.64, p<.001). DP (deep processing of cognitive engagement) partially mediated the association between PCAS-K and SI. And the relationship between PCAS-K and IN (individual interest) was fully

mediated by SI (situational interest). As hypothesized, however, the relation between PCAS-K and IN was not mediated by DP (deep processing) in this study. The final items for Study 2 are presented in Table 24.

For the purpose of detecting mediation effects, bootstrapping was employed in the study. Bootstrapping, the statistical package available in Amos 18.0, tested the mediation effects among variables of interest, repeatedly resampling the data set and estimating indirect effects in each data set in multiple mediator models (Preacher & Hayes, 2008). Hence, it can be also useful for small sample sizes. It provides not only *p*-values but confidence intervals for testing significance of mediation effects. Although I examined both of these, only *p*-values are reported in the next section.

Figure 2. Final Standardized Structural Model



Chapter 6

Discussion

Purpose of the Current Study and Problems

The purpose of the dissertation was to explore how students' perceptions of the different types of autonomy support, in the form of PCAS (perceived cognitive autonomy support) and PC (perceived choice), would be associated with the motivational variable of student interest, differentiated into situational and individual interest, mediated by different levels of cognitive processing, deep and surface processing. In this chapter, I will discuss the findings in terms of the four research questions with which I began the study, dealing with both direct and indirect relationships in Study 2. And then, I will articulate the general discussion. Next, I will address the limitations of the study. Finally, I will provide implications for practice.

Discussion of the Findings

Research Question 1

1. The relationship between students' initial interest and different levels of situational interest and individual interest at the end of the semester:

1a) Would students' initial interest be directly related to different levels of student interest in different ways?

My hypothesis was that students' initial interest would be positively related to different levels of student interest. In other words, I assumed that the higher students' initial interest would be, the higher situational or individual interest the students would have at the end of the semesters. This hypothesis was not supported by these data. The

relations between initial interest and both situational interest and individual interest were quite weak (β=.03, p>.05; β=.00, p>.05, respectively). In particular, there was no statistically meaningful relationship between students' initial interest in the College Writing Course and their individual interest at the end of the sememster. This implies that students' initial interest was not directly associated with their interest at the end of the semester in the study. According to Krapp, Hidi, and Renninger (1992), interest is a phenomenon that "emerged from an individual's interaction with his or her environment" (p.5). Then what would be environmental predictors of student interest? This finding indicated that other environmental or contextual factors such as teacher effect, the degree of difficulty of the subject, and any other classroom mood would play an important role in students' feeling of interest at the end of semester.

1b) Would the relation between students' initial interest and the levels of situational and individual interest be mediated differently by different types of autonomy support in the class, perceived cognitive autonomy support (PCAS) and perceived choice (PC)?

My hypothesis was that the relationship between students' initial interest and different levels of student interest would be mediated differently by different types of autonomy support in class, contrasting PCAS and PC. The result showed that initial interest was positively related to situational interest via higher level of PCAS (β=.13, p<.05). Especially, the relationship between initial interest and situaional interest was partially mediated by PCAS in this model. The partial mediation among initial interest,

students' perceptions of cognitive autonomy support, and situatonal interest was found when conducting bootstrapping analysis, examining the *p* value of indirect effets. That is, the *p* values of both direct and indirect effects were less than .05, and the total effect was also significant. However, initial interest was not associated with individual interest via levels of PCAS (β=.01, *p*>.05). In contrast, students' initial interest was associated with neither situational interest nor individual interest via PC (perceived choice) (β= -.01, *p*>.05 and β=.03, *p*>.05, respectively).

Thus, my hypothesis that students' initial interest would be indirectly and also positively related to their individual interest through higher level of PCAS (perceived cognitive autonomy support) was not supported in the current study. But the connection between initial interest and situational interest via students' perceptions of cognitive autonomy support was significant. In line with the definition of situational interest, it is triggered by environmental factors and may develop across time (Hidi, 1990). Teachers' provision of cognitive autonomy support may function as a critical environmental factor, triggering students' feelings of situational interest.

In sum, students' feelings of initial interest in a writing class directly did not predict situational interest. However, their perceptions of teachers' cognitive autonomy support (PCAS) mediated the association between their initial interest and situational interest.

Research Question 2

2. The relationship between perceived cognitive autonomy support (PCAS) and different levels of student interest at the end of the semester:

2a) Would PCAS be directly related to different levels of student interest in different ways?

I had hypothesized that students' PCAS would be positively related to different levels of student interest in different ways. In other words, the more cognitive autonomy support students perceived in class, the higher individual interest students would report at the end of semester, compared to situational interest. The hypothesis was partially supported by the data in that PCAS did mediate the connection between initial interest and end-of-semester interest but it was situational rather than individual interest that was affected. That is, students' perception of cognitive autonomy support in class was not positively related to students' individual interest but to their situational interest. The standardized regression coefficient between PCAS-K and IN (individual interest) was too small (β=.03, p>.05) wheras the coefficient between PCAS-K and SI (situational interest) was positively strong (β=.64, p<.001). Students who experienced cognitive autonomy support in class, allowing them to think freely and express their own ideas in their own way, were more likely to have higher situational interest at the end of the semester.

A possible reason for this phenomenon would be supported by the rationale that students' individual interest might not be strongly affected by PCAS (perceived cognitive autonomy) in the short time period, about three months, of a semester. Individual interest is more likely to develop over time. Hidi and Baird (1988) and Krapp (1989)

differentiated individual interest from situational interest. From their perspective, personal or individual interest designates interest that individuals bring to a certain environment and also that they 'develop over time,' whereas situational interest is likely to be affected by situation-specific environmental factors, including interesting learning materials or humorous or supportive instructors, even in a relatively short time period. In this sense, this finding seemed to be more plausible than my hypothesis had been. If a more longitudinal study had been conducted for this research question, a contrasting finding supporting my original hypothesis would have been revealed.

2b) Would the relationship between students' perceptions of cognitive autonomy support and different levels of situational and individual interest be mediated differently by different levels of cognitive engagement such as surface processing and deep processing?

I had hypothesized that students' perceptions of cognitive autonomy support in class would be indirectly and also strongly related to students' individual interest through meaningful levels of cognitive processing, what I had termed *deep processing* in this study. Results indicated that students' perceptions of cognitive autonomy support given by instructors positively and strongly predicted both levels of cognitive engagement, surface processing as well as deep processing (β=.56, p<.01 and β=.60, p<.01, respectively).

Through bootstrapping analysis, however, it was suggested that deep processing such as developing their own ideas or alternatives in class did not mediate the

relationship between students' perceptions of cognitive autonomy and individual interest in a significant way (β= -.01, p>.05). Thus, there was no mediation effect among perceived cognitive autonomy support, deep processing, and individual interest.

Also, the relatioships among the three variables were weak but inversely associated in the study. Although students' perceived autonomy support strongly predicted cognitive deep processing (β=.60, p<.01), deep processing weakly but inversely predicted individual interest (β= -.02, p>.05). This finding indicated an interesting phenomemon that students might have felt burdened by instructors' external support focusing on cognitive autonomy in the college writng coure, considering that they were mostly freshmen. Although the relationship between their perceptions of cognitive autonomy support and deep cognitive processing was positively high (β=.60, p<.05), the reason why deep processing did not predict students' feeling of individual interest significantly, even related to it negatively, might have resulted from ego depletion because of high psychological and cognitive cost.

The possibility that students felt exhausted and experienced ego depletion in an environment supportive of cognitive autonomy may be more plausible because a college writing course is commonly known as a demanding course. Also, possibly, considering that individual interest might not be easily affected by contextual variables, the short time period to measure any changes in students' interest in writing course might have resulted in this finding.

By contrast, results of bootstrapping analysis indicated that students' cognitive deep processing partially mediated the relationship between students' perceptions of

cognitive autonomy support and situational interest (β=.20, p<.05), with the indirect effect less than .05 in the bootstrapping analysis output (p-value=.003).

More interestingly, the indirect effect among PCAS, DP (deep processing), SI (situational interest), and IN (individual interest) was not strong but statistically significant (β=.19, p<.05). That is, although students' perceived cognitive autonomy support might not predict individual interest via deep processing, it predicted students' individual interest through both deep cognitive processing and feelings of situational interest. This implication is interesting in that the feeling of situational interest might positively affect students' individual interest over time. Originally, the second hypothesis was generated based on these ideas from Hidi, Renninger, and Krapp (2004) who considered student interest as an important motivational variable that combines both affective and cognitive components, emphasizing the role of the cognitive component in interest development. That is, from their point of view, individual interest may develop from situational interest by having more cognitive facets of interest across time. In light of this, the indirect relationship among these four variables seems to provide a kind of empirical evidence of theory.

In relation to the second hypothesis, another related question was whether students' perceived cognitive autonomy support would be indirectly related to their situational interest through surface, rather than deep cognitive processing, including rote memory and simple study strategies. This idea was based on the idea that PCAS would be more associated with deep cognitive processing because it would likely come from instructor encouragement of comparing or contrasting different ideas or concepts rather

than encouraging memorization or reading repetitively. Although students' perceptions of cognitive autonomy support positively and strongly predited situational interest (β=.64, p<.01) and it also positively predicted surface level of cognitive processing (β=.56, p<.01), there was no mediation effect among PCAS, surface processing, and situational interest (β= -.01, p>.05). Examining the relation between surface processing and situational interest, interestingly, surface levels of cognitive processing did not predict either situational interest or individual interest in the study (β= -.01, p>.05 and β= -.01, p>.05, respectively). Summarizing all the findings here, the results support the hypothesis that the role of deep level of cognitive processing might play an important role in developing feelings of interest from situational to individual interest for the class.

Research Question 3

3. The relationship between students' perceived choice (PC) and different levels of student interest at the end of the semester:

3a) Would PC be directly related differently to different levels of student interest, situational as compared to individual interest?

Regarding Research Question 3, I had hypothesized that students' perceptions of having choice in class would be related to different levels of student interest in distinct ways: the more chances to have choice in learning tasks students perceived in class, the higher situational interest students would report at the end of semester, compared to individual interest. Simultaneously, I had anticipated that having choice would not significantly influence deep processing and individual interest. This hypothesis was

partially supported. PC predicted neither students' individual interest nor their situational interest, even to the point that the direct association between PC (perceived choice) and SI (situational interest) was negative though not statistically significant (β= -.10, p>.05). In the present study, in terms of its direct relationship to other variables, students' perceptions of having choice did not positively predict any latent variable. All the regression coefficients were very weak and not statistically significant. All the standardized βs from PC to other variables such as SP, DP, SI and IN ranged from -.01 to .03. Most of all, this finding also contradicts many existing theory and findings about the positive relationship between students' perceptions of autonomy support through having choice and student interest (e. g., Black & Deci, 2000).

In the current study, students' perceptions of having choice were more likely to be associated with task choice. In case in which having task choice does not have much reasonable relevance, students might not experience feelings of interest in the educational context (Assor et al., 2002). Research has proposed that fostering relevance had more influential impact on students' perceptions of autonomy. The phenomenon should be examined more deeply in the future to explore if it is the problem of cultural differences by comparing two or more groups of students from different cultural educational background to see how perceived choice functions.

3b)Would the relationship between students' PC and different levels of interest, situational as compared to individual interest, be mediated differently by different levels of cognitive engagement, surface processing as compared to deep processing?

Another hypothesis in Research Question 3 was that the relationship between students' perceptions of having choice and different levels of situational and individual interest would be mediated differently by different types of cognitive processing. First, results indicated that before examining the mediation effect, students' perceptions of having choice did not meaningfully predict either surface or deep processing at all (β= -.01, p>.05 and β=.10, p>.05, repectively).

Originally, the relationship between PC and SI (situational interest) was anticipated to be mediated by SP (surface processing). Yet, the association among these three variables was not supported by the data (β= -.0001, p>.05). That is, there was no mediation effect at all. Also, there was no mediation effect between students' perception of having choice, deep processing, and individual interest (β=.03, p>.05). More research is needed to explore the mediation effect of students' perception of having choice between different levels of cognitive engagement and situational interest with different samples of college students.

Research Question 4

4. The relationship between students' situational and individual interest:

Hidi and Renninger (2006) proposed a four-phase model of interest development, from situational interest to individual interest. They postulated that situational interest would develop into individual interest via cognitive aspects of learning including accumulated knowledge and values. Their model of interest development posited four sequential phases: triggered situational interest, maintained situational interest, emerging

individual interest, and well-developed individual interest. In Research Question 4, I focused on the association of two sequential phases of feeling interested such as situational and individual interes.

On the basis of this theoretical background, the last hypothesis that students' situational interest would positivelybe related to individual interest was explored. Results supported my hypothesis, partially validating the model by articulating a positive strong association between SI and IN (β=.95, p<.05). The high standard total effect between these two interest constructs might have resulted from a strong correlation between the two instruments. Linnenbrink-Garcia et al. (2010) demonstrated that the two constructs were differentiated into different factors. However, their correlation proved to be quite high in the preliminary phase of my study. As described in Study 2, situational interest and individual interest are not dichotomous. They actively affect each other, while interacting with environmental factors. In this sense, their high correlation was anticipated. Therefore, more careful examination should be conducted in the future by revisiting the scales and validating them based on thorough theoretical background.

General Discussion

Based on recent trailblazing research on various types of autonomy support and interest, this study focused on cognitive autonomy support, a less often explored and different type of autonomy support, and its role in developing student interest in class. Autonomy includes the ability for self-determination or self-governance of actions in the process of learning. Also, autonomy support in social contexts contributes to intrinsic motivation for action (Deci, Vallerand, Pelletier, & Ryan, 1991; Hardre & Reeve, 2003).

Although the relationship between autonomy support and motivation for learning has been empirically supported, instructors still have trouble implementing autonomy support in class in motivating students over time (Ames, 1992; Stefanou et al. 2004). Considering this limitation, this study focused on exploring various types of autonomy encompassing the provision of choice and support for cognitive autonomy in class. Furthermore, it examined their relationships to student interest by expanding different kinds of autonomy support in class, using SEM (structural equation modeling). The goal was to identify strong associations among three key variables, perceived cognitive autonomy support (PCAS), deep processing (DP), and individual interest (IN).

Results were that the main research goal was not highly supported by the data. Instead, there were other meaningful findings about strong and positive associations between students' perception of cognitive autonomy support and situational interest, mediated by deep cognitive processing. Further, students' experience of situational interest strongly predicted individual interest. Considering these effects, students' perceptions of cognitive autonomy support in class seemed to accompany deep levels of cognitive engagement, and their association impacted their feelings of situational interest, emphasizing the importance of environmental external factors in interest development. The positive relationship among these variables would then predict individual interest over time.

In addition, the relationships between PCAS and other key constructs, especially the two levels of cognitive processing and student interest, especially situational interest, proved to be much stronger than the association of perceived choice (PC) with these

variables in the current study. For example, in comparing indicators of the connection of PCAS and PC on student interest, the standardized total effects of PCAS on SI (situational interest) and IN (individual interest) were .83 and .80 respectively, whereas the total effects of PC on SI and IN were -.07 and -.04. Although the negative association between students' perceptions of having choice in class and feelings of interest needs to be examined further in future studies, the finding sheds light on the role of cognitive autonomy support as another critical type of autonomy support teachers can employ in class.

In sum, students' experience of instructors' cognitive autonomy support in class seemed associated with feeling more interested in a college writing course, whereas students having choice in class seemed unrelated to feeling interested in classroom activities. Therefore, the findings indicate that instructors should consider providing various types of autonomy support, using cognitive autonomy support as well as choice to support students' interest development in the classroom. This is one of the major contributions of the present study, expanding the spectrum of autonomy support in class.

Limitations and Future Studies

Along with these interesting findings, this study also had limitations that need to be acknowledged. First, for the purpose of more in-depth and contextualized examination, class observation could be included. Although this study followed upon what Stefanou et al. (2004) had found through class observations, the learning environments differed. Their study was conducted in math classes in an elementary school in a western culture. More class observations might be required to capture

differences in how autonomy support is enacted in different cultures. Although I used mixed methods in my project with both focus group interviews in Study 1A and correlational statistical methods in Study 2, I did not have any class observations as a data source. A future project with a more extensive use of class observations with a check list for autonomy support would allow me to examine both what instructors say and do and, more importantly, how the instructor and students interact in class. In this way, other critical confounding variables such as class structure, class size, class organization, instructors' enthusiasm, and emotional relatedness between instructor and students could be explored (Reeve & Jang, 2006).

Although this study was more focused on the cognitive facet of autonomy support and interest, it is easy to imagine that affective outcomes from cognitive autonomy support would also be associated with students' feelings of interest for a class. As shown in the positive association among PCAS, DP (deep processing), and SI (situational interest), some affective outcomes generated in an environment with cognitive autonomy support might be connected to deep processing and good cognitive engagement without any ego depletion or psychological costs. In this way, positive outcomes from relationship would result in students' feelings of situational interest, interest commonly generated from so-called good relationships between instructors and students or from exciting materials. Thus, another future research project could involve an examination of the affective aspects resulting from cognitive autonomy supportive contexts after exploring whether the affective aspect would function importantly through class observations.

Second, with respect to the short time I had to explore student interest, as the very weak but negative direct relationship between initial interest and individual interest indicated (β=-.004, p>.05), students might experience less motivation during the time period of three months in a demanding course, like a college writing. However, compared to the impact of PC (perceived choice), the relationships between PCAS (students' perception of cognitive autonomy support) and other variables such as initial interest at Time 1, situational interest at Time 2, and indirectly individual interest at Time 2 were all positive and statistically significant. In line with the findings, it would be possible to say that PCAS would function more positively and strongly as a boosting variable for individual interest, allowing for initial interest to covary more with individual interest if there had been more enough time for students to experience cognitive autonomy support. Further, if the study had been conducted for a longer term, the hypothesis of main research interest about the strong relationship between PCAS and IN (individual interest) mediated by DP (deep processing) might have been supported in the data. Thus, a longer-term study should be listed for future research to identify the positive association among them.

Third, when it comes to generalization issues, the findings of this study may not be appropriately applied to other contexts. Participants in Study 1 and Study 2 were mainly from a specific university, mostly with academically highly-achieving students. Considering the possibility of the high psychological cost in autonomy supportive contexts, students with low initial interest in a certain subject or little background

knowledge might experience a loss of interest coming from sensing the need to invest too much effort in such classes (Black & Deci, 2000).

In fact, in Study 1A, the qualitative study phase, 29 participants from two different universities responded to an open-ended written survey. Among them, 10 participants were from the university (group 1) where participants for Study 2 belonged. Another group of students, 19 students, who joined only the open-ended written survey session, had slightly lower entrance exam scores (group 2). Although any differences were not reported in the result section of Study 1A because the differences were minor, it was more likely for the 19 students from the second university to perceive and define autonomy as having choice or controlling the classroom environment to their own preferences whereas the students from the first university mostly reported their perception of autonomy as related to cognitive autonomy support. This interesting inclination would be interesting to pursue in future research and may have implications for practice in the classroom.

For example, according to different academic achievement levels or specific learning contexts, the experiences of having choice might be more effective than I found for student motivation and student interest. Also, considering relatively immature cognitive function, middle schoolers' perceptions of cognitive autonomy and other types of autonomy and their effects on motivation would differ from undergraduates's perception and impacts. In addition, it is interesting to speculate whether individuals from different cultures such as Eastern cultures known to be more controlling and Western cultures known to be more liberal would respond differently. Actually, a pilot study

conducted with American undergraduates was the impetus for the present study. In Study 1A, the subscales and their features of cognitive autonomy support and perceived choice for American undergraduates and Korean students were juxtaposed, and in the end, proved to be quite similar. Yet, the correlational analyses were not conducted with responses from students from two different cultures in the present study. Hence, testing different groups of individuals from different contexts would be required for meaningful generalization of the findings.

Finally, regarding measurement issues, because the data were nested in classes with 11 different instructors, MSEM (multilevel structural equation modeling) might reveal more valid research findings, accommodating simultaneous estimation of many other possible multilevel mediations in clustered data (Preacher et al., 2010). However, SEM was conducted in Study 2. In the current study, 260 participants in total participated in the study. Although there were 11 instructors for these 260 students, one of the instructors taught three classes and another six taught two classes each. Also, the number of students' responding to surveys per class in Study 2 varied from 3 to 25. These imbalances in terms of the number of responders per class interrupted the use of MSEM. In this sense, group differences could function as a confounding variable in the study.

Another measurement issue pertains to the problems of using invalid scales in my study. First, PCAS-K and PC-K scales were newly developed in Study 1, and they had not yet been tested in any other contexts. Although their reliabilities and validities were examined many times in different phases of Study 1 and Study 2, these scales need to be validated in other studies and settings for better validity, testing whether or not the new

scales are assessing what they were intended to measure. Additionally, the scales of SI (situational interest) and IN (individual interest) proved to be highly correlated with each other in my data. Although these scales had been validated as measuring two distinct factors in Linnenbrink-Garcia et al.'s (2010) study, they covaried strongly in my study. Presumably, these validity issues for some scales might have negatively influenced the findings in the study.

Implications for Practice

Students in traditional schools have reported a steady decrease in motivation for learning in class as time progresses, especially in a demanding course (Anderman & Maehr, 1994; Harter, 1981). At the same time, instructors who encounter amotivated students have trouble motivating them and further involving them in learning deeply. This section sheds light on practices teachers can implement in class to foster students' feelings of autonomy and interest, through surface or deep cognitive processing.

The results from Studies 1 and 2 provide several meaningful implications for practice. In general, this study is meaningful in that it focused on students' perceptions of cognitive autonomy support (PCAS), another way to support student autonomy, indicating significant relationships among PCAS, deep cognitive processing, and student interest.

First, the findings may provide instructors with practical implications for practice, encouraging them to implement cognitive autonomy support in class. New scales to measure students' perception of different types of autonomy support in class were developed in the present study, using mixed research methods. Based on what Stefanou et

al. (2004) found through class observations and what I found through a qualitative study and factor analyses in Study 1, a kind of manual implying how to support students' cognitive autonomy in class was generated. For example, the five subscales of the PCAS-K scale give some indication of what a teacher might do to support autonomy: 1) *Having enough time to think,* 2) *thinking differently, exploring multiple solutions,* 3) *self-directed learning,* 4) *communicating actively between instructors and students,* and 5) *having a discussion among students*. Under the second category, *thinking differently, exploring multiple solutions,* for example, there is an item saying, "My instructor encourages me to present different approaches to the same issue or problem." The information in this item implies that students feel cognitively autonomous when teachers provide them with chances to present various ideas in class. Instructors who want to provide students with cognitive autonomy support in class can find guidance from this information.

The second significant implication for practice is the support from the findings of a meaningful relationship between PCAS and student interest. The result indicated that PCAS was positively associated with situational interest. Students in a class they judged to be supportive of cognitive autonomy, experiencing opportunities to think freely and express their own ideas, were more likely to report higher interest.

On the other hand, PC (students' perception of having choice) was not significantly correlated with student interest, either as situational or individual interest at the end of the semester. Rather, PC was negatively associated with situational interest. These results imply that provision of choice might not guarantee student interest in their instructors, their instructional practices, or even the content of a certain subject.

Considering these, instructors need to provide students with choice more carefully, combining the provision of choice with other types of autonomy support or other teaching methods to support students'feelingsof autonomy and interest.

For all ages and cultures, people are likely to desire to be self-determined and self-directed. Students in class also desire to think freely or differently, exploring learning contents. In cognitive autonomy-supportive environments, they may deepen their understanding, learn more, and explore many different ideas, finally feeling more interested in the contents over time. The research findings in the current study encourage teachers to employ and combine various kinds of autonomy support to boost student interest, even in a challenging course. In this supportive learning environment, students may become more self-regulated or self-directed in learning as independent learners, controlling their own motivation.

Appendix A

Study 1A- a version in English

Thank you for your participation in the study. This is an anonymous survey. You are not to provide your name in this questionnaire. Please carefully respond to the questions below and write what you think. Please do not read all the questions in advance and not correct your answers.

This survey is asking about your perception or experiences in class. If you agree to participate in the study, please sign below.

Date:_____ Signature:_____

Demographic Questions

The responses for the following questions will be used only for this research. Please response to the following questions honestly.

1. Gender: (1) Male (2) Female

2. Classification: (1) Freshman, (2) Sophomore, (3) Junior, (4) Senior

3. Major/College: _____

4. Overall GPA: _____ (not necessary)

5. Name of the course you are supposed to answer this questionnaire based on:

_____ _

6. Is this a required course? Yes_____ No_____

1. From your own perspective, what is the feeling of freedom or autonomy that can be given by an instructor in a lecture room?

2. What kinds of autonomy or freedom have you actually experienced in class?

3. In which case did you feel free or autonomous in terms of your behaviors?

4. In which case did you feel free or autonomous in terms of your thinking or cognition?

5. Among various kinds of autonomy given by an instructor in class, which one do you think impacts your feeling of interest more positively between the freedom/autonomy of ‘behaviors’ and the freedom/autonomy of ‘thinking’?

6. Between the two kinds of freedom or autonomy, which one do you think is more worthwhile?

7. Between the two above, which do you believe influences your emotion or affect more positively?

Appendix B

Study 1A- a version in Korean

이 실험에 참여해주셔서 대단히 감사합니다.

이 설문은 한국 대학생들이 수업 중 교실에서 경험하는 교수법과 관련한 그들의 인지에 대한 연구에 기초합니다. 문항을 잘 읽고 솔직하게 답변해 주시길 바랍니다.

또한 이 설문은 익명성이 보장되며, 피험자의 신상에 아무런 영향을 미치지 않습니다. 문의 사항이 있으시면 **lje2008@utexas.edu**로 문의바랍니다.

이 실험에 동의하시면 아래 빈칸에 본인의 서명을 해주시길 바랍니다.

일자_____ 서명: _____

간단한 질문 사항입니다. 아래 질문들에 대한 응답은 이 실험을 위해서만 사용됩니다. 있는 그대로 정직하게 답변해주시길 바랍니다.

1. 성: **(1)** 남성 **(2)** 여성

2. 학년: **(1) 1**학년, **(2) 2**학년, **(3) 3**학년, **(4) 4**학년

3. 학부대학 및 전공 : _____**(** 예: 인문학부 영문과**)**

4. 누적 **GPA (**성적**):** _____**(**선택사항**)**

Study 1A

다음을 주의 깊게 읽고 질문에 신중하게 대답해 주십시오. 전체 질문을 먼저 읽고 답하지 않고, 1번부터 7번까지 순차적으로 질문을 읽고 하나씩 작성해주십시오. 절대 이미 작성한 답변을 수정하거나 나중에 답변을 추가하지 않도록 합니다. 질문입니다.

1. 당신이 생각하는 대학 강의실에서 자율성이란 무엇입니까?

2. 당신이 강의실에서 강사님이나 교수님에게서 경험한 “자유” 혹은 “자율성”은 어떠한 종류입니까?

3. 당신은 수업 중 어떠한 경우에 당신의 “행동”에 자유를 느끼십니까?

4. 당신은 수업 중 어떠한 경우에 당신의 “사고 혹은 생각”에 자유를 느끼십니까?

5. 당신은 수업 중 강사님이나 교수님으로부터 주어지는 자율성 중에서, 즉 “행동”의 자유와 “사고”의 자유 중에서 어떠한 것이 더욱 “학습자의 흥미 (interest)”에 도움이 된다고 생각하십니까?

6. 위의 두 가지 자율성 중에서 어떠한 것이 더욱 학습적 가치가 있다고 생각하십니까?

7. 위의 두 가지 자율성 중에서 어떠한 것이 감정 (emotion/ affect)에 더욱 긍정적인 영향을 준다고 믿습니까?

Appendix C

Study 1B- a version in English

Thank you for your participation in the study. This is an anonymous survey. You are not to provide your name in this questionnaire. Please carefully respond to the questions below.

Demographic Questions

The responses for the following questions will be used only for this research. Please response to the following questions honestly.

1. Gender: (1) Male (2) Female

2. Classification: (1) Freshman, (2) Sophomore, (3) Junior, (4) Senior

3. Major/College: _____

4. Overall GPA: _____(Not necessary)

5. Name of the course you are supposed to answer this questionnaire based on:

_____ _

6. Is this a required course? Yes_____ No_____

Perception of CAS Questionnaire

Please choose and identify one of the courses that you are taking in this semester. Note that it does not matter whether you are satisfied with the course or not. Write down its name here: _____

Is this a required course? Yes_____ No_____

Please read each of the following items carefully, thinking about how it relates to the course that you have chosen. And then, indicate how true it is for you. Your responses are confidential. Please be honest and straightforward. Use the following scale to respond.

1	2	3	4	5	6	7
Not at all true			somewhat true			very true

[ENOUGH TIME TO THINK]

1. My instructor gives me enough time to think about what we learn in the classroom.
2. I am allowed to spend time discussing some issues in class.
3. I have enough time to exchange ideas with others.
4. I have ample time for decision making in this class.
5. I have enough time to solve some questions by myself.

[MULTIPLE SOLUTIONS/COGNITIVE FLEXIBILITY]

6. My instructor encourages me to present different approaches to the same issue or problem.
7. My instructor allows me to employ various sources in order to consider an issue or solve a problem.
8. My instructor asks me to discuss multiple approaches.
9. I am allowed to use different methods to solve a problem.
10. My instructor gives me freedom to think in different ways.

11. My instructor welcomes different opinions.

[SELF-DIRECTED LEARNING/SELF-RELIANT LEARNING]

12. I feel that I am an independent thinker or problem solver through classroom activities.
13. I experience many chances to justify or argue for my points.
14. My instructor encourages me to generate my own thinking.
15. I feel that I am the owner of my learning in this class.
16. I believe that I can make a decision about a class issue according to my own criteria.
17. My instructor encourages me to think about some information, rather than just telling us.
18. My instructor asks me to evaluate my own or other students' ideas.

[(ENCOURAGING) CRITICAL THINKING/ CONVERGENT THINKING]

19. My instructor helps me think about some issues in a critical way.
20. I am encouraged to compare or contrast different ideas by my teacher.
21. My teacher encourages me to relate the material presented in my class to my background knowledge.
22. My instructor pushes me to come up with some alternative ways to interpret something.
23. My teacher encourages me to think how to apply the knowledge I've just learned.
24. My instructor makes me generate questions about the ideas and issues we are learning.

[PERCEIVED BELIEFS ABOUT ACADEMIC ENVIRONMENT]

25. I believe that my instructor is open to debate.
26. I feel that my ideas are respected by my instructor and other classmates in this class.
27. I am encouraged to share ideas or expertise with others
28. My instructor does not make me feel dumb.
29. I feel my instructor listens carefully to what I am saying.

30. My instructor makes me feel like I am saying something meaningful.

[PERCEIVED CHOICE]

1. My instructor gives me chances to choose an assignment topic.
2. My instructor allows me to choose materials to use in class projects.
3. I feel I have freedom in how to handle materials to study.
4. My instructor provides me with an opportunity to choose evaluation procedures.
5. I feel I have some say in deciding due dates for assignments.
6. My instructor allows me to choose my group members.
7. My instructor gives me a chance to select the topic of the presentation or paper.

[PERCEIVED CHOICE SCALE] ASSOR ET AL. (2002)

1. When I am doing something that interests me, instructor gives me enough time to finish it.
2. Instructor allows me to choose how to do my work in the classroom.
3. Instructor asks us which topics we would like to study more and which we prefer to study less.
4. Instructor asks us if there are things we would like to change in the way we study.
5. Instructor allows me to choose to study topics that interest me.
6. When instructor gives us an assignment she or he allows us to choose which question to answer.
7. Instructor encourages me to work in my own way.

[PERCEIVED COGNITIVE AUTONOMY SUPPORT] TSAI ET AL. (2008)

1. We worked through exercises that helped us understand the topic.
2. Different students presented their solutions to the same task.
3. Our teacher set tasks that required time to reflect.
4. Our teacher emphasized the relations between the topics discussed.

Appendix D

Study 1B- a version in Korean

이 실험에 참여해주셔서 대단히 감사합니다.

이 설문은 한국 대학생들이 수업 중 교실에서 경험하는 교수법과 관련한 그들의 인지에 대한 연구에 기초합니다. 문항을 잘 읽고 솔직하게 답변해 주시길 바랍니다.

또한 이 설문은 익명성이 보장되며, 피험자의 신상에 아무런 영향을 미치지 않습니다. 문의 사항이 있으시면 lje2008@utexas.edu로 문의바랍니다.

이 실험에 동의하시면 아래 빈칸에 본인의 서명을 해주시길 바랍니다.

일자_____ **서명:** _____

간단한 질문 사항입니다. 아래 질문들에 대한 응답은 이 실험을 위해서만 사용됩니다. 있는 그대로 정직하게 답변해주시길 바랍니다.

1. Gender (성): (1) Male (남성) (2) Female (여성)

2. Classification: (1) Freshman, (2) Sophomore, (3) Junior, (4) Senior

3. Major/College (학부대학) : _____(예: 인문학부)

4. Overall GPA (누적 GPA): _____

5. Name of the course you are supposed to answer this questionnaire based on (본 설문 혹은 연구에 응답하기 위해 본인이 선택한 강좌의 이름): _____

6. Is this a required course? (선택한 강좌가 필수인가? 선택인가?) Yes_____
No_____

7. The type of the class? 해당하는 것에 O, X 표시 하시오.
토론식 ( ), 강의식 ( ), 혼합형 ( )

Perception of CAS Questionnaire (PCAS 문항지)

1. 다음 1 부터 7 까지의 척도를 사용하여, **본인이 생각하는 정도를 숫자로 적어주세요.**
2. **본인이 "이 설문을 위해 선택한 강의"를 떠올리며, 각 문장 옆에 솔직하고 분명하게 숫자로 표시해주세요.**
3. **모든 문항은 해당 "수업중" 본인이 느끼고 경험한 것에 기초합니다.**

1	2	3	4	5	6	7
전혀			다소			매우
아니다			그렇다			그렇다

[PCAS]

1. 교수님은 나에게 수업내용에 대해 충분히 생각할 시간을 제공한다.

2. 나는 수업 중 수업 내용에 관한 토론 시간을 가질 수 있다

3. 나는 동료 학생들과 의견을 나눌 시간이 충분히 시간이 있다

4. 나는 수업시간에 어떤 문제에 대한 해답을 찾기 위한 시간을 넉넉히 가진다

5. 나는 수업 중 스스로 문제를 해결할 시간이 충분하다.

6. 교수님은 내가 어떠한 주제나 문제들에 다양한 방식으로 접근할 수 있도록 격려한다.

7. 교수님은 내가 어떠한 문제로 고민하거나 그 문제를 풀려고 할 때, 다양한 자료를 이용하도록 한다.

8. 교수님은 내가 발표하거나 토론할 때, 다양한 접근 방식으로 토론하도록 한다.

9. 나는 수업 중 하나의 문제를 해결하기 위해 다양한 방법(론)을 사용할 수 있다

10. 교수님은 내가 다양한 방식으로 생각할 수 있는 자유를 주신다.

11. 교수님은 우리들의 다양한 의견들을 듣기를 좋아한다

12. 나는 수업시간의 활동을 통해서 스스로 독립적으로 사고하거나 문제를 해결할 수 있다고 느낀다

13. 나는 내 의견을 변호하거나 옹호할 기회를 가진 적이 많다

14. 교수님은 내가 창의적인 생각을 하도록 격려한다

15. 나는 내 스스로가 수업시간에 학습의 주체라고 느낀다

16. 나는 내 스스로의 기준에 따라, 수업 활동을 결정할 수 있다고 믿는다.

17. 교수님은 단순히 우리에게 지식을 전달하기 보다는, 우리가 스스로 수업내용에 관해 생각해 보기를 권유한다

18. 교수님은 내가 스스로의 혹은 다른 학생들의 아이디어를 평가하도록 권유한다

19. 교수님은 내가 비평적인 사고를 하도록 돕는다

20. 교수님은 내가 각각의 아이디어를 비교하거나 대조하도록 한다

21. 교수님은 내가 수업 내용을 내가 알고 있는 배경지식과 연관시키도록 격려한다.

22. 교수님은 내가 수업내용을 이해하기 위한 다양한 것들을 생각해 내도록 한다

23. 교수님은 내가 방금 배운 지식을 활용하는 방법을 생각해보도록 격려한다.

24. 교수님은 우리가 배우고 있는 아이디어나 주제들에 관해 내가 질문하도록 유도한다

25. 나는 교수님이 의견을 교환하고 나누는데 적극적이라고 생각한다.

26. 나는 수업시간에 교수님이나 다른 학생들이 내 아이디어를 존중한다고 느낀다.

27. 교수님은 내가 다른 학생들과 아이디어와 의견을 주고받도록 고무한다.

28. 교수님은 내가 바보라고 느껴지게 만들지 않는다.

29. 나는 교수님이 나의 의견을 주의 깊게 듣는다고 느낀다.

30. 교수님 덕분에 나는 수업 중 무언가 중요한 이야기를 하고 있다는 기분이 든다.

[PC]

1. 교수님은 나에게 과제의 주제를 선택할 기회를 준다.

2. 교수님은 내게 수업 시간 활동에 필요한 자료를 선택할 기회를 준다.

3. 나는 수업 자료를 자유롭게 활용할 수 있다고 느낀다.

4. 교수님은 나에게 평가 방식을 선택할 기회를 제공한다.

5. 나는 과제 제출일 결정에 관여할 수 있다고 느낀다.

6. 교수님은 나에게 조별 활동의 조원들을 선택할 기회를 준다.

7. 교수님은 나에게 발표나 과제의 주제를 선택할 기회를 준다.

[Perceive Choice – Assor et al. (2002)]

1. 내가 흥미를 느낀 활동을 하고 있을 때, 교수님은 그것을 마칠 충분한 시간을 준다.

2. 교수님은 수업 시간에 어떻게 학습활동을 할 지를 선택하도록 한다.

3. 교수님은 학생들이 스스로 주제에 따라 원하는 대로 시간 배분을 할 수 있도록 한다

4. 교수님은 수업을 진행하는 동안 수업 방식을 바꾸기를 원하는 지를 학생들에게 묻는다.

5. 교수님은 내가 흥미를 가지는 연구 주제를 선택할 수 있도록 한다.

6. 교수님은 과제를 줄 때, 학생들이 과제나 특정 질문이나 문제(들)을 선택할 수 있도록 한다.

7. 교수님은 내가 일하는 방식을 존중한다.

[Perceived cognitive autonomy support] Tsai et al. (2008)

1. 우리는 주제를 이해하는 데에 도움이 되는 문제를 푼 적이 있다.

2. 다른 학생들이 동일한 과제에 대해 각각의 다른 해결방식을 제시한 적이 있다.

3. 교수님은 생각할 시간이 필요한 과제를 준 적이 있다.

4. 교수님은 토론 주제들 간의 관계들을 강조했다.

Thank you for your sincere answers.
(수고하셨습니다. 성실하고 진실한 답변에 대해 매우 감사 드립니다.)

Appendix E

Study 2-Time 1 Questionnaire: Initial Interest- a version in English

INSTRUCTIONS: Please read each of the following items carefully, thinking about how it relates to the writing course that you are taking this semester and then indicate how true it is for you. There is no right or wrong answer on the items. So please be honest and straight forward and use the following scale to respond.

1	2	3	4	5	6	7
Not at all true			somewhat true			very true

1. I've always been fascinated by this course.

2. I chose to take this course because I'm really interested in the topic.

3. I'm really excited about taking this class.

4. I'm really looking forward to learning more about this course.

5. I think the field of this course is an important discipline.

6. I think what we will study in this course will be important for me to know.

7. I think what we will study in this course will be worthwhile to know.

Appendix F

Study 2-Time 1 Questionnaire: Initial Interest- a version in Korean

이 실험에 참여해주셔서 대단히 감사합니다. 이 설문은 한국 대학생들이 수업 중 교실에서 경험하는 교수법과 관련한 그들의 다양한 인지에 대한 연구입니다. 따라서 피험자의 신상에 아무런 영향을 미치지 않습니다. 문항을 잘 읽고 솔직하게 답변해 주시길 바랍니다.

또한 이 설문은 익명성이 보장되며, 본 실험의 분석자인 실험자만이 이 설문과 정보에 접근할 수 있습니다. 문의 사항이 있으시면lje2008@utexas.edu로 문의바랍니다. 이 실험에 동의하시면 아래 빈칸에 본인의 서명을 해주시길 바랍니다.

일자_____ 서명: _____

Demographic Questions

간단한 질문 사항입니다. 아래 질문들에 대한 응답은 이 실험을 위해서만 사용됩니다. 있는 그대로 정직하게 답변해주시길 바랍니다.

1. Gender (성): (1) Male (남성) (2) Female (여성)

2. Classification (학년): (1) Freshman, (2) Sophomore, (3) Junior, (4) Senior

3. Major/College (학부대학): _____ (예: 인문학부)

4. Name of the course you are supposed to answer this questionnaire based on (본 강좌명): _____ _

5. Is this a required course (필수과목인가)? Yes_____ No_____

6. Have you ever taken a writing course previously?
(이 수업 이전에 글쓰기 수업을 들어본 적 있는가? 중등교육포함)

Yes (그렇다) A. How long (기간)?
B. When (시기)?
C. If so, was it a required course (필수과목이었나)?

No

7. What do you think has impacted your learning and motivation to do well in the course most? (당신은 한 강좌에서 어떠한 요소가 당신의 학습과 동기에 가장 많은 영향을 미친다고 생각하는가?)

_____

8. 본인의 휴대폰번호 뒷 자리, 네 개를 적어주세요. (이는 신상과 아무런 관계없는 단지 식별용으로 쓰일 뿐입니다.)

_____

감사합니다.

다음은 “글쓰기 강좌”에 대한 당신의 관심과 흥미도를 측정하는 설문입니다. 각 문항을 주의깊게 읽고, “글쓰기 강좌”에 대한 답변을 정확하고 솔직하게 해주십시오. 정답 혹은 오답은 없습니다.

다음 1부터 7까지의 척도를 사용하여, **본인이 생각하는 정도를 숫자로 적어주세요.**

1	2	3	4	5	6	7
Not at all true			somewhat true			very true
전혀 아니다			**다소 그렇다**			**매우 그렇다**

1. 나는 늘 글쓰기에 흥미를 느낀다.
2. 나는 항상 이 수업에 관심이 많았다.
3. 나는 이 수업을 듣는 것이 굉장히 좋다.
4. 나는 진심으로 이 강좌에서 많은 것을 배우기를 기대한다.
5. 나는 글쓰기가 매우 중요한 수업이라고 생각한다.
6. 나는 이 강의에서 배우게 될 것들이 매우 중요하다고 생각한다.
7. 나는 이 강의에서 배우게 될 내용들이 충분히 알아둘 가치가 있다고 생각한다.

Appendix G

Study 2-Time 2 Questionnaire- a version in English

Please read each of the following items carefully, thinking about how it relates to the **writing course**. And then, indicate how true it is for you. Your responses are confidential. Please be honest and straightforward. Use the following scale to respond.

1	2	3	4	5	6	7
Not at all true			somewhat true			very true

[ENOUGH TIME TO THINK]

1. My instructor gives me enough time to think about what we learn in the classroom.
2. I am allowed to spend time discussing some issues in class.
3. I have enough time to exchange ideas with others.
4. I have ample time for decision making in this class.
5. I have enough time to solve some questions by myself.

[MULTIPLE SOLUTIONS/COGNITIVE FLEXIBILITY]

6. My instructor encourages me to present different approaches to the same issue or problem.
7. My instructor allows me to employ various sources in order to consider an issue or solve a problem.
8. My instructor asks me to discuss multiple approaches.
9. I am allowed to use different methods to solve a problem.
10. My instructor gives me freedom to think in different ways.
11. My instructor welcomes different opinions.

[SELF-DIRECTED LEARNING/SELF-RELIANT LEARNING]

12. I feel that I am an independent thinker or problem solver through classroom activities.

13. I experience many chances to justify or argue for my points.

14. My instructor encourages me to generate my own thinking.

15. I feel that I am the owner of my learning in this class.

16. I believe that I can make a decision about a class issue according to my own criteria.

17. My instructor encourages me to think about some information, rather than just telling us.

18. My instructor asks me to evaluate my own or other students' ideas.

[(ENCOURAGING) CRITICAL THINKING/ CONVERGENT THINKING]

19. My instructor helps me think about some issues in a critical way.

20. I am encouraged to compare or contrast different ideas by my teacher.

21. My teacher encourages me to relate the material presented in my class to my background knowledge.

22. My instructor pushes me to come up with some alternative ways to interpret something.

23. My teacher encourages me to think how to apply the knowledge I've just learned.

24. My instructor makes me generate questions about the ideas and issues we are learning.

[PERCEIVED BELIEFS ABOUT ACADEMIC ENVIRONMENT]

25. I believe that my instructor is open to debate.

26. I feel that my ideas are respected by my instructor and other classmates in this class.

27. I am encouraged to share ideas or expertise with others

28. My instructor does not make me feel dumb.

29. I feel my instructor listens carefully to what I am saying.

30. My instructor makes me feel like I am saying something meaningful.

[PERCEIVED CHOICE]

1. My instructor gives me chances to choose an assignment topic.

2. My instructor allows me to choose materials to use in class projects.

3. I feel I have freedom in how to handle materials to study.

4. My instructor provides me with an opportunity to choose evaluation procedures.

5. I feel I have some say in deciding due dates for assignments.

6. My instructor allows me to choose my group members.

7. My instructor gives me a chance to select the topic of the presentation or paper.

[Situational Interest] (original version)

1. My psychology instructor is exciting.

2. What we are learning in psychology class this year is fascinating to me.

3. This year, my psychology class is often entertaining.

4. We are studying in psychology class is useful for me to know.

5. When we do psychology, my instructor does things that grab my attention.

6. I am excited about what we are learning in psychology class this year.

7. I like what we are learning in psychology this year.

8. I find the psychology we do in class this year interesting.

9. My psychology class is so exciting it's easy to pay attention.

10. The things we are studying in psychology this year are important to me.

11. What we are learning in psychology this year can be applied to real life.

12. We are learning valuable things in psychology class this year.

Triggered-SI: 1, 5, 3, 9

Maintained-SI-Feeling: 2, 6, 7, 8

Maintained-SI-value: 4, 10, 11, 12

[Individual interest] (original version)

1. Psychology course is practical for me to know.

2. Psychology course helps me in my daily life outside of school.

3. It is important to me to be a person who reasons psychologically.

4. Thinking psychologically is an important part of who I am.

5. I enjoy the subject of Psychology course.

6. I like Psychology course.

7. I enjoy doing Psychology.
8. College Writing is exciting to me.

[Deep processing]

1. When a theoretical point or conclusion is presented in lecture or in the text, I try to decide if there is good supporting evidence.
2. I treat the course material as a starting point and try to develop my own ideas about it.
3. Whenever I read or hear a theoretical point in this course, I think about possible alternatives.
4. I never question the validity of the theories presented in the text or by the professor. (reversed)
5. I try to think through topics and decide what I'm supposed to learn from then, rather than studying topics by just reading them over.

[Surface processing]

1. When I study for the exam, I try to memorize as many facts as I can.
2. When I study for this course, I go through the test and my lecture notes and try to find the most important ideas to memorize.
3. When studying for this course, I read the text and my notes over and over again to help me remember the material.
4. I study for this course by memorizing the definitions at the end of each chapter of the text.
5. I try to memorize everythin that I think will be on the exam.

Thank you for your response

Appendix H

Study 2-Time 2 Questionnaire- a version in Korean

이 설문에 참여해주셔서 대단히 감사합니다. 이 설문은 한국 대학생들이 글쓰기 수업 중 교실에서 경험하는 교수법과 관련한 그들의 인지 및 동기에 대한 질문입니다. 학기 초와 학기 말, 두 번 실시하도록 되어있으며, 본 설문은 그 두 번째 설문입니다.

이 설문은 익명성이 보장되며, 피험자의 신상에 아무런 영향을 미치지 않습니다. 따라서 각 문항을 잘 읽고, 솔직하고 정확하게 답하여 주십시오. 관련 문의 사항이 있으시면 lje2008@utexas.edu로 문의바랍니다.

이 실험에 동의하시면 아래 빈칸에 본인의 서명을 해주시길 바랍니다.

일자_____ 서명: _____

간단한 질문 사항입니다. 아래 질문들에 대한 응답은 이 실험을 위해서만 사용됩니다. 있는 그대로 정직하게 답변해주시길 바랍니다.

1. Gender (성): (1) Male (남성) (2) Female (여성)

2. Classification: (1) Freshman, (2) Sophomore, (3) Junior, (4) Senior

3. Major/College (학부대학) : _____(예: 인문학부)

4. The type of the class? 본 강좌의 강의 방식은? 해당하는 것에 O, X 표시 하세요.

토론식 ( ), 강의식 ( ), 혼합형 ( )

5. 본인의 **휴대폰 번호 뒤 자리, 네 개**를 **반드시** 적어주세요. (이는 1차와 2차 설문지를 매칭하기 위해, 단지 식별용으로만 쓰일 뿐입니다.)

(_____)

설문지 작성 방법

1. 다음 1 부터 7 까지의 척도를 사용하여, **본인이 생각하는 정도를 숫자로 적어주세요.**
2. **이번 학기에 본인이 수강하고 있는 "글쓰기 강좌"를 떠올리며, 각 문장 옆에 솔직하고 분명하게 숫자로 표시해주세요.**
3. **모든 문항에 대한 응답은 해당 "수업중" 본인이 느끼고 경험한 것에 기초합니다.**

1	2	3	4	5	6	7
전혀 아니다			다소 그렇다			매우 그렇다

[PCAS 1~30]

1. 교수님은 나에게 수업내용에 대해 생각할 시간을 충분히 제공한다.

2. 나는 수업 중 수업 내용에 관한 토론 시간을 가질 수 있다.

3. 나는 동료 학생들과 의견을 나눌 시간이 충분히 있다.

4. 나는 수업시간에 어떤 문제에 대한 해답을 찾기 위해 충분한 시간을 가진다.

5. 나는 수업 중 스스로 어떠한 문제나 질문을 해결할 시간이 충분하다.

6. 교수님은 내가 어떠한 주제나 문제들에 다양한 방식으로 접근할 수 있도록 격려한다.

7. 교수님은 내가 어떠한 문제로 고민하거나 그 문제를 풀려고 할 때, 다양한 자료를 이용하도록 한다.

8. 교수님은 내가 발표하거나 토론할 때, 다양한 접근 방식으로 토론하도록 한다.

9. 나는 수업 중 하나의 문제를 해결하기 위해 다양한 방법(론)을 사용할 수 있다.

10. 교수님은 내가 다양한 방식으로 생각할 수 있는 자유를 주신다.

11. 교수님은 우리들의 다양한 의견을 듣기를 좋아한다.

12. 나는 수업시간의 활동을 통해서 내 스스로 독립적으로 사고하거나 문제를 해결할 수 있다고 느낀다.

13. 나는 내 의견을 변호하거나 옹호할 기회를 가진 적이 많다.

14. 교수님은 내가 창의적인 생각을 하도록 격려한다.

15. 나는 글쓰기 수업 중 내 스스로가 학습의 주체라고 느낀다.

16. 나는 내 스스로의 기준에 따라, 수업 활동을 결정할 수 있다고 믿는다.

17. 교수님은 단순히 우리에게 지식을 전달하기 보다는, 우리가 스스로 수업내용에 관해 생각해 보기를 권유한다.

18. 교수님은 내가 스스로의 혹은 다른 학생들의 아이디어를 비교 평가하도록 권장한다.

19. 교수님은 내가 비평적인 사고를 하도록 돕는다.

20. 교수님은 내가 각각의 아이디어를 비교하거나 대조하도록 한다.

21. 교수님은 내가 수업 내용을 내가 알고 있는 배경지식과 연관시키도록 격려한다.

22. 교수님은 내가 수업내용을 이해하기 위한 다양한 것들을 생각해 내도록 한다.

23. 교수님은 내가 방금 배운 지식을 활용하는 방법을 생각해보도록 격려한다.

24. 교수님은 우리가 배우고 있는 아이디어나 주제들에 관해 내가 질문하도록 유도한다

25. 나는 교수님이 우리와 의견을 교환하고 나누는데 적극적이라고 생각한다.

26. 나는 수업시간에 교수님이나 다른 학생들이 내 아이디어를 존중한다고 느낀다.

27. 교수님은 내가 다른 학생들과 아이디어와 의견을 주고받도록 고무한다.

28. 교수님은 내가 바보라고 느껴지게 만들지 않는다.

29. 나는 교수님이 나의 의견을 주의 깊게 듣는다고 느낀다.

30. 교수님 덕분에 나는 수업 중 무언가 중요한 이야기를 하고 있다는 기분이 든다.

[PC 1~7]

1. 교수님은 나에게 과제의 주제 등을 선택할 기회를 준다.

2. 교수님은 내게 수업 시간 활동에 필요한 읽기 자료를 선택할 기회를 준다.

3. 나는 수업 자료를 자유롭게 활용할 수 있다고 느낀다.

4. 교수님은 나에게 성적관련 평가 방식을 선택할 기회를 제공한다.

5. 나는 과제 제출일 결정에 관여할 수 있다고 느낀다.

6. 교수님은 나에게 조별 활동의 조원들을 선택할 기회를 준다.

7. 교수님은 나에게 발표나 과제의 주제를 선택할 기회를 준다.

1	2	3	4	5	6	7
전혀			다소			매우
아니다			그렇다			그렇다

[Situational Interest 1~12]

1. 글쓰기 수업 교수님은 재미있게 수업을 진행한다.

2. 이번 학기 수업 시간에 배우는 내용이 매우 흥미롭다.

3. 이 수업은 전반적으로 재미있다.

4. 이 수업을 통해 배운 내용은 알아두면 유익한 지식이다.

5. 수업 중에, 교수님은 나의 관심을 끌만한 주제와 소재를 다룬다.

6. 이번 학기 수업에서 배운 내용에 많은 흥미를 느낀다.

7. 이번 학기 수업에서 배우고 있는 내용이 마음에 든다.

8. 수업 시간에 하는 여러 가지 활동들이 흥미롭다.

9. 이 수업은 너무 재미있어서 쉽게 집중할 수 있다.

10. 나는 이번 학기에 배운 내용이 중요하다고 생각한다.

11. 이번 학기 수업 시간에 배운 내용은 강의실 밖에서의 실제 글쓰기에 적용

될 수 있다.

12. 이번 학기에 배운 내용은 가치 있다.

[Individual Interest 1~6]
1. 이 수업에서 배우는 내용은 실질적인 글쓰기에 도움이 된다.

2. 이 수업은 강의실 바깥에서의 실제 글쓰기 생활에 도움이 된다.

3. 나는 이 수업의 주제가 재미있다.

4. 나는 이 수업이 좋다.

5. 나는 수업 시간에 하는 활동들이 재미있다.

6. 나는 이 수업이 흥미롭다.

[Deep Processing 1~5]
1. 수업 중, 혹은 참고서적에서 제시되는 이론 등을 접할 때, 나는 그 이론을 뒷받침하는 합당한 근거가 있는지를 찾으려고 애쓴다.

2. 나는 수업 교재를 기본으로 하여, 그 내용에 대한 나의 생각을 발전시키기 위해 노력한다.

3. 나는 이 수업에서 이론이나 글쓰기 법 등을 읽거나 접할 때 마다, 관련된 다른 것들 것 생각해내려고 한다.

4. 나는 텍스트나 교수님에 의해 제시되는 각각 이론이나 법칙들의 타당성을 거의 의심하지 않는다.

5. 나는 수업의 요지 혹은 주제를 읽음으로써 막연하게 공부하기 보다는, 그것에 대해 생각하고, 내가 그것으로부터 배우고자 하는 것을 정한다.

[Surface Processing 1~5]

1. 나는 시험공부를 할 때, 수업 중 배운 것은 가능한 한 많이 기억해내려고 애쓴다.

2. 나는 글쓰기 수업 관련 공부를 할 때, 교재나 유인물, 그리고 내 노트 필기를 복습하고 기억해야 할 중요한 정보를 찾아내려고 노력한다.

3. 나는 글쓰기 수업 관련 공부를 할 때, 교재나 유인물, 그리고 노트 필기 내용을 기억하기 위해 반복적으로 계속해서 읽는다.

4. 나는 교재나 유인물에 제시된 용어나 개념을 기억하려고 노력한다.

5. 나는 글쓰기 과제에 활용될 모든 지식과 정보를 기억하려고 노력한다.

Thank you for your sincere answers.

(수고하셨습니다. 성실하고 진실한 답변에 대해 매우 감사 드립니다.)

Appendix I

Study 1A-Open-ended Written Question (Answers to Q3)

	C								TC				EC		Freq.
Person No.	C1	C2	C3	C4	C5	C6	C7	C8	TC1	TC2	TC3	TC4	E1	E2	
1 NA															0
2									V						1
3											v		V	v	3
4														v	1
5		v					v								2
6														v	1
7			v	v									V	v	4
8														v	1
9														v	1
10				v											1
11													V		1
12														v	1
13				v										v	2
14 NA															0
15														v	1
16														v	1
17 NA															0
18				v											1
19														v	1
20														v	1
21														v	1
22														v	1
23														v	1
24														v	1
25														v	1
26														v	1
27														v	1
28 NA															0
Freq.	0	1	1	4	0	0	1	0	1	0	1	0	3	19	
Total	7								2				21		

Q 3: In which case did you feel free or autonomous in terms of your behaviors?

Appendix J

Study 1A-Open-ended Written Question (Answers to Q4)

Q 4: In which case did you feel free or autonomous in terms of your thinking or cognition?

	C								TC				EC		Freq.
Person No.	C1	C2	C3	C4	C5	C6	C7	C8	TC1	TC2	TC3	TC4	E1	E2	
1		v				v									2
2	v				v	v									3
3					v		v								2
4					v	v									2
5		v													1
6			v	v											2
7					v		v								2
8	v			v	v										3
9					v	v									2
10					v										1
11														v	1
12					v										1
13		v					v								2
14					v										1
15			v												1
16 NA															0
17 NA															0
18							v								1
19 NA															0
20					v										1
21				v											1
22				v			v								2
23 NA															0
24				v											1
25								v							1
26			v	v			v								3
27			v												1
28		v													1
Freq.	2	4	4	6	10	3	6	1	0	0	0	0	0	1	
	36								0				1		

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